Home Computing WEEKLY

NEW

An Argus Specialist Publication

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38p

INSIDE

Programs to type in for: Oric-1, Spectrum, ZX81, Dragon, Video Genie / TRS-80

Software reviews for: Spectrum, ZX81, BBC, Dragon, VIC-20, NewBrain

Best seller charts for: Spectrum, VIC, ZX81, Dragon

NOW A BETTER DEAL FOR BUYERS

You will be able to put more trust in what sales staff say about computers, says the Computer Trade Association which is setting up a training scheme.

Concerned about complaints, members plan to encourage classes at technical colleges and award certificates and diplomas.

Secretary Nigel Backhurst said: "The courses will not teach them how to sell.

"The idea is to give those selling computers a better technical background so that they can give a better service to the customer."

He said the scheme, due to be discussed at a CTA meeting next week, would be self-financing with an exam fee of £5-10.

Mr Blanchard had received more than 30 complaints about misleading advice given in some chain stores, although two large chains stressed their thorough training for staff.

As a result, he toured a number of stores and found that computer knowledge among the sales staff varied widely.

Since a report in Home Computing Weekly, Mr Backhurst has been contacted by two retail training officers who spoke of their difficulties in providing a general background in computing to their staff.

And two technical colleges offered to run part-time courses.

Now the CTA has in mind inviting more colleges to run courses to improve the computer knowledge of sales people.

The association would check the syllabuses and make two-stage awards. One would be a diploma, equivalent to a C.S.E. and there would be a certificate for more advanced knowledge.

Association chairman Tony Shiel, of Knot Komputing, said the type of queries sales staff should be able to answer included the difference

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A micro for the poet

A hundred poems by computer in seven hours — that was the goal of Dave Morice's computer poetry marathon.

Seated at an Apple in the window of Books Etc in London's Charing Cross Road, he said: "I've already written two plays, several articles and 100 pages of a novel on a computer. I shied away from the idea at first — it seemed too remote. But now I enjoy it because it's easier. I wouldn't write a novel with a typewriter. You can make the changes so much quicker by computer."

Dave an American who usually works as a computer typesetter in Iowa City, was writing the poems to publicise his book Cartoon Poems, which came out on May 9. He's now working on a new book Com-

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WINNING GAMES from LYVERSOFT

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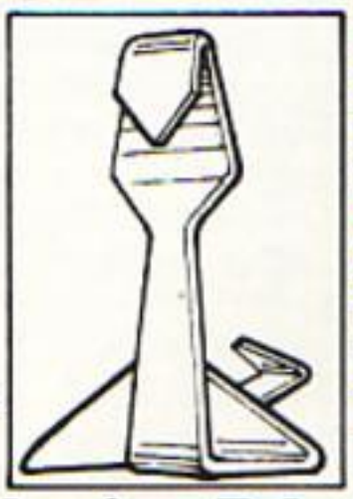

*Suitable for use with Sinclair ZX81 or Spectrum (Specify when ordering)

COBRA Technology Limited

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Manufacturers of Quality Micro Technology Peripherals HCW12

QUEST
'THE BLACK HOLE'
Highest score received to date 963 by Darren Gerald of Christchurch, Dorset.

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Don't miss next week's election special: programs for the Spectrum and VIC-20 to type in

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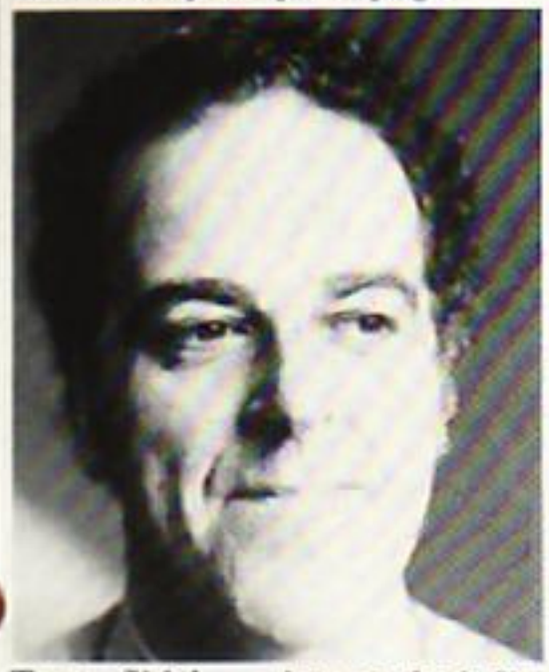

Tony Shiel — better deal for buyers

between computer languages, what high-resolution means and the difference between eight-bit and 16-bit micros.

Mr Shiel, who said he admired the training Tandy gave to its staff, also wanted sales people taught about the legal side of retailing — not to make claims which the computers could not live up to.

Computer Trade Association, 108 Margaret Street, Coalville, Leics LE6 2LX

• • •

New for the 64

Commodore is bringing out a compiler and an extended version of BASIC for its 64 computer.

Petspeed 64, bought from Oxford Computer Systems for an estimated £100,000, is a four-pass compiler which is reckoned to generate code running up to 20 times faster than the original BASIC program.

And Simons BASIC, named afte the writer David Simons, adds 114 instructions, including RENUMber, and is said to give easy access to colour and sprite commands.

Both will cost £50 and are due to go on sale for the 4th International Commodore Computer Show, at the Cunard Hotel, Hammersmith, on June 9-11.

Commodore Business Machines (UK), 675 Ajax Avenue, Slough, Berks SL1 4BG

NEW FREE CATALOGUES
The best for Spectrum or ZX81.
Call 24 hours, give name, address, computer.
01-789 8546
Software Supermarket

BBC gives first aid to chemists

The BBC Micro will be giving chemists some first aid, thanks to a new package from John Richardson Computers.

By the end of this year, chemists will be required to print all the lables on the drugs they issue instead of writing them out by hand.

Using the BBC connected up to a printer and disk drive, they can print up to 2,000 different types of drugs and hundreds of different doses — as well as keeping track of their stocks of drugs.

To do this, though, the BBC has to be upgraded to 96K using a special expansion board, which John Richardson believes is the first board of this size ever to be used in a microcomputer.

But at the end of the day, the upgraded micro can still be unplugged and taken home for an evening of programming or games playing.

John Richardson Computers, Unit 337, Walton Summit, Bamber Bridge, Preston, Lancs PR6 8AR

• • •

Rent a Spectrum

Sinclair Research has welcomed a lending library . . . for computers.

Gloucester library has bought 12 of the company's Spectrums for borrowers who leave a £50 deposit and pay £10 for two weeks.

A Sinclair spokesman said: "It seems like a good idea. It can only encourage more people to take an interest in computing."

The scheme is run by Gloucester County Council's technical services department outside normal library hours, on Fridays between 5.30pm and 8pm. If successful, it will spread to other libraries.

WINDOW ON ANOTHER WORLD

NEW RELEASES

STAR JAMMER — Wiping the sweat from my brow, I searched the inky blackness, ahead for signs of enemy fighters. 'Though Star Jammer was the best ship in the galaxy, my dwindling energy reserves made me doubt I could reach the next stargate. . .(a one player space arcade game requiring 1 joystick)

SUPER SKILL HANGMAN — Hangman as you've never played it before!
A vocabulary of over 1000 words, three levels of difficulty and an optional timer makes this classic word game a challenge for kids of all ages.

NIGHTFLIGHT — An accurate simulation of flying a single engine light aircraft, Nightflight allows for take-off, landing, and aerial manoeuvers including loops and rolls.

SALAMANDER GRAPHICS SYSTEM — A comprehensive picture drawing system for the home computer enthusiast. Pictures in any mode or colour set, text on the hi-res screens, and storage of pictures on tape. Requires 1 joystick.

ORIC TREK — A version of our classic Dragon Trek for the Oric-1! 10 levels of difficulty, 3 sizes of galaxy and more features than you can shake a Klingon at. A must for all Oric owners!

ORIC GAMES COMPENDIUM — Four exciting games for the whole family: Donkey Derby, Kingdom, Viper and Space Station.

DRAGON 32 and TANDY 32K (please specify):
Dragon Trek £9.95. Wizard War £7.95. Golf £7.95. Grand Prix £7.95. Vulcan Noughts & Crosses £7.95. Games Comp D1 £7.95. Salamander Graphics System £9.95. Super Skill Hangman £7.95. Star Jammer £7.95. Nightlight £7.95.

BBC MODEL B
Dragon Rider £7.95. Tanks! £7.95. Games Comp B1 £6.95. Games Comp B3 £6.95. EDG Graphics (tape) £24.95. EDG Graphics (disc) £29.95.
ORIC 1: Oric Trek £9.95. Games Comp 01 £7.95.

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HCW12

Salamander Software

Lowdown on the U.S. software game

If you like to read interesting and informative books on computers and related subjects, you will want to write to these people. dilithium Press (the lower case d is correct) is one of the best known quality small publishers around. Here is a very small sampling from their latest catalog: The Sinclair ZX-81 Programming for Real Applications; The Year Of The Robot; How to Make Money With Your Microcomputer; TRS-80 Color Programs (for the Color Computer); plus lots more.

One nice feature is that software for their books is usually available, saving you the trouble and aggravation of having to key it in yourself. The other nice thing is that most of their books cost less than $16. Write for a catalog. dilithium Press, P.O. Box 606, Beaverton Oregon 97075.

From Abacus Software comes a line of interesting items for the Vic, Commodore 64, and the Pet. Among the 20 or so items in their product line, these caught my immediate attention: Vic Teny Pilot, the interactive educational language, $17.95; Pet Tiny Pascal, $39.95; Tiny Basic Compiler, $19.95; and Cribbage (the card game) for $14.95. If you write to them they will send you a free catalog.

For your information, they charge $3.00 for postage and handling "elsewhere" and accept U.S. dollars by check, international money order, Access or Barclaycard. Write to them. They are ready for you. Abacus Software, P.O. Box 7211, Grand Rapids, Michigan 49510, (616) 241 5510.

Having a hard time remembering all those details about your ZX-81? Now there is a 10-page reference card available of particular interest to owners of the ZX-81 (we call it the Timex 1000) The information on the card covers BASIC commands and functions, special commands, operators, graphics, codes from 0 to 255, useful ROM calls, programming tips, memory maps, timing charts, hex/decimal conversions, op codes, and information on **Peek** *and* **Poke**.

All this and more for only $5.95 from Nanos Systems Corp., P.O. Box 24344, Speedway Indiana 46224, (317) 244-4078.

If you are an active reader and cannot get your fill of computer books, you might try joining The Computer Book Club. At the present time, they are running an introductory offer. You pick your choice of five titles, worth up to $102.75, pay only $2.95 for all five (plus shipping), then all you have to do is buy four more books in the next year. All books offered are sold at a discount which is at leas t 20-75 per cent less than list. There are many other benefits of membership in this very excellent and legitimate book club owned by one of America's largest technical book publishers. Write for details to The Computer Book Club, Blue Ridge Summit, PA 17214.

That's all for now. See you next week — same time, same place.
Bud Izen
Fairfield, California

Continued from front page

puter Comics. He said: "It's going to be written on a real simple level for people who don't know anything about computers. It'll deal with the history, sociology and future of computers".

Dave is a computer games enthusiast whose particular favourites are Tron, Frogger and Pacman. Of this poem, written for Home Computing Weekly, he said: "It's the longest I've written today. It just shows what happens when you give someone a topic they like."

```
Alice, who was sitting behind Brian,
jumped up and pushed one of the men
to get in front of her husband,
who was busily playing Pacman.
Not discouraged, he turned to
the Frogger game a few feet away
and hopped over to it. Depositing
a token, he watched with fascination
as the frog appeared on the screen.
The timer began. He moved the joystick
back and forth, up and down, and
jumped across the electronic highway,
then the stream, but alas landed his frog
on the back of an alligator, where it sunk.
"Alice!" he screamed, "This is your fault.
Get over here and quit playing
Pacman--it's a waste of money!"
She was involved in a heavy
game of Tron, though, and was
about to lose her tanks...
```

One of Dave's poems — inspired by computer games

SPECTRUM
TRS 80

LOTS OF INTERESTING SOFTWARE FOR THE ABOVE, E.G:-
SPECTRUM EDUCATIONAL GAMES
CASSETTE 1. ARITHMETIC GAMES
CASSETTE 2. LOGIC GAMES
PRICE £4.95 EACH
LEVEL 1 IS EASY. HIGHEST LEVEL IS FORBIDDEN TO MERE MORTALS.

CAMEL MICROS. 33A COMMERCIAL RD., WEYMOUTH, DORSET (03057) 70092 HCW12

Scott of the keyboard

Selina Scott, now a breakfast TV presenter, handed over the 100,000th BBC micro to the speech therapy unit of Charing Cross Hospital.

It was donated free by BBC Enterprises for use with a device called Toucan, a voice synthesiser and visual aid which can be programmed with words and phrases for each patient.

Selina Scott at the keyboard with Hugh Rossi, Minister for Social Security and the Disabled, and chief speech therapist Alison Perry

You could be on our pages

We welcome programs articles and tips from our readers.

PROGRAMS should, if possible, be computer printed to a width of 48 characters (use a new ribbon) and/or sent on cassette. Check carefully that they are bug-free. Include details of what your program does, how it works, variables you have used and hints on conversion.

ARTICLES on using home computers should be no longer than 2,000 words. Don't worry about your writing ability — just try to keep to the style in HCW. Articles most likely to be published will help our readers make better use of their micros by giving useful ideas, possibly with programming examples. We will convert any sketched illustrations into finished artwork.

TIPS are short articles, and brief programming routines which we can put together with others. Your hints can aid other computer users.

Competitive rates are paid.

Keep a copy of your submissions and include an SAE if you want them returned. Label everything clearly and give a daytime and home phone number if you can.

Paul Liptrot, Home Computing Weekly, 145 Charing Cross Road, London WC2H 0EE

Let us program

You could soon be seeing more of your clergyman thanks to a new program which not only saves paperwork but tells him the best route for his visiting rounds.

It was written by 27-year-old Gareth Morgan, who has degrees in both theology and computer science.

His wife Sharon, 25, his partner in Gareth Morgan Computer Services, said: "He decided his real vocation was in lay work and put the two together."

Mrs Morgan explained that the package, running on the TRS-80 model III, is entirely inter-religious — it will work just an happily organising an Anglican church or a Sikh temple.

It is called Kubernesis, which is Greek for administrator (see I Corinthians).

So far two copies, at £150 for disc and 56-page manual, have been sold — one to an Anglican clergyman and one to a Methodist.

The package can record facts on congregations of up to 620, provided the computer has 48K of RAM and two disc drives, including notes like dates of birth, recent illnesses, Sunday School membership and so on.

And it will sort addresses by post code, cutting down travelling time between visits.

The couple are both involved with their local Anglican church. Mr Morgan hopes soon to be a lay preacher and Mrs Morgan is a member of the Parochial Church Council.

Mr Morgan, a freelance consultant working on IBM mainframes, wrote Kubernesis over nine months.

They suggest purchasers also buy a word processing package to speed up sermon writing and production of newsletters.

And there are more ideas in the pipeline, including a package which will plan visits by preachers to cirucit Methodist churches and another which will produce statistics on baptisms, weddings, funerals and confirmations.

One clergyman has also suggested a program whch will search a database of hymns to find one most suitable for that week's sermon.

Gareth Morgan Computer Services, 34 Avon Park, Bristol BS5 9RS

Oric joysticks

Pasesoft has brought out what it says is the first joystick interface for the Oric-1.

It costs £14.99, including a free game called Tracer Racer, and will run one or two Atari-type joysticks.

The company, which recently combined with Ozark Software, has just launched six tapes for the Oric, all priced at £4.99. They are: Adventureland, Five Alive, Worm, Pioneer 1847, a machine code monitor and a disassembler.

Pasesoft, 213-215 Market Street, Hyde, Cheshire SK14 1HF

K-tel: more sign soon

More software companies would be signing deals with K-tel, known until now for heavily advertised record albums, to distribute 15 titles by dk'tronics.

Mr Moulds said: "I expect more signing within weeks. I can't be more specific — we are talking to a lot of people simultaneously — but we have the capacity to handle up to a dozen ranges easily."

K-tel says its store-by-store system can distribute software more efficiently than present methods.

K-tel International (UK), 620 Western Avenue, London W3 0TU

Packed with TI programs

Home Computing Weekly contributor Vince Apps has just published a book of 35 programs for the standard TI-99/4A.

They are mainly games — including a 3D maze — plus some for educational and household use. The Texas Program Book, published by Phoenix Publishing Associates, costs £5.95.

Phoenix Publishing Associates, 14 Vernon Road, Bushey, Herts WD2 2JL

We're the cheapest

Clement Chambers, boss of software CRL, claims he has broken a price barrier by bringing out four cassettes for the ZX81 which retail at £3.50 each.

Mr Chambers said: "We decided to break new territory in price because we thought young children can't afford more on their pocket money.

"We are not making as much profit, of course, but there are about half a million ZX81s about and we hope to sell more as a result.

"This is the first time at these prices in a retail outlet. If I'd had one of them two years ago the price would have been £6.95."

The four games, on sale in John Menzies, are Escape from Manhattan, J.D. Arcades, 10 1K Games and Alien Rain/Outrider.

CRL, 140 Whitechapel Road, London E1 1EJ

TI's two offers

Texas Instruments, now advertising its TI-99/4A on TV, is making two offers to buyers.

All purchasers sending a form to TI will get products worth £50 free: a pari of joysticks, a BASIC tutorial cassette and a software cartridge.

And anyone buying six cartridges for the TI-99/4A can get a free speech synthesiser or cassette recorder. Both offers end on July 2.

Texas Instruments, Manton Lane, Bedford MK41 7PA

Survival is the game

Newly-formed Linus Software is bringing out its first tape, an adventure called Armageddon, based on survival after a nuclear holocaust. Running on the 16K ZX81, it will cost £4.50.

Linus Software, 17/4 West Winnelstrae, Fettes Park, Ferry Road, Edinburgh

Bamby software

Leverburgh, Isle of Harris PA83 3TX Tel 085 982 313.

Introduce original games for Dragon 32

Golden Apples:- Steal the apples, then defeat the warlock. £5-95.

Planetary Trader:- Choose your cargo (that's the easy bit) then deliver it £5-95.

Surprise:- Spells, giants, a magic ring, but not another 'Lord of the Rings' £8-45.

Mini-games:- 4 games per tape, simple but compelling! £5-95.

All tapes include Postage & Packing and a ∴∴∴ no-quibble guarantee.

Write to us at the above address, or ring anytime between 9a.m. and 9p.m. (Alternative phone no: 085-982-239.)

Don't be fooled by micro ads

One thing that never fails to amuse me is the advertising blurb that companies release to sell their computers, software and peripherals. I have noticed several distinctive styles of computer ads in the time that I have been computing. Here are a few of them.

1 *The "Buy-it-for-the-children" approach. This method is usually deployed in the High Street stores to catch parents unawares, and is most prevalent at Christmas. According to the blurb, the children's education will suffer unless you rush into the shop and buy a particular brand of micro or piece of software.*

However useful micros may be as teaching aids, I think this "buy it or else" tactic is pretty unscrupulous. Anxious parents might end up struggling financially to buy their little Freddy a home computer of his own after seeing such ads.

2 *The "We've-got-more-than-them" technique. The first colour and sound micro and 3½K RAM (despite excaggerated claims to 5K), the next had 16K, followed by 32, then 48, and now 64K. Who really uses all that much memory? How soon will it be before a company claims to have a 256K machine with a 50-colour display and quadrophonic sound, all for under £100?*

3 *Possibly the ugliest side of computer advertising is the downright lies that are told by some companies about their products.*

The offenders shall remain nameless, but for example certain companies have shown in their ads pictures on a television screen that could not possibly be produced on their product—just the thing to fool, and disappoint, an uninitiated beginner to computing.

Another misleading element is the specifications chart showing selected aspects of the micro being promoted compared with the competition. The worst I have seen showed the machine's capabilities with the words "NO COMPARABLE COMPETITION" scrawled across the spaces left in the table for the BBC Micro, Apple, and "Japanese imitations". What about the features they left out?

4 *This section shows how desperate computer manufactures are getting for new customers. I refer of course to the Channel 4 advert where a row of bespectacled men feed facts into different computers, which all come up with the same make as the best. This kind of petty sniping is just laughable.*

To conclude, I would advise any prospective computer buyer to read a lot of magazine reviews before taking the plunge of buying computer hardware or software. These reviews often present a much better picture of the product than an advertisment ever will.

Mark Phillips
Student, Eastleigh, Hants

● What makes you pleased or annoyed about the micro scene, hardware or software? We welcome contributions for this column. Send them to: Paul Liprtot, Opinion, Home Computing Weekly, 145 Charing Cross Road, London WC2H 0EE. Please include your occupation and your interest in computing.

Push your Sinclair to the limit

ZX81/SPECTRUM ARCADE GAMES

NEW **ZX INVASION FORCE** (ZX81)
Use your skill to fire through the energy band to destroy the menacing alien ship — **£3.95**

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These exciting high-speed classic games incorporate hi-resolutiongraphics and sound to bring you the best in arcade action at only **£4.95** each (16/48K)

NEW **SPEC FROG 5/SHOWDOWN** (16/48K)
Hop across the dangerous road avoiding the lethal cars, then lorries. Go back to the wild west for a gunfight battle amongst cacti and wagons. Features include western music. **£4.95**

NEW **NAMTIR RAIDERS** (ZX81)
High speed, quick action arcade game with four separate groups of attackers. **£3.95**

Gobbleman also available for ZX81 at **£3.95**

UTILITIES

NEW **TOOLKIT**
Nine powerful new functions for your ZX81 (including re-number lines (goto, gosub), program merge, string finding and replacement. **£5.95**

SPEC BUG
A 30 in 1 machine code tool and disassembler for your ZX Spectrum. **£6.95**

ZX BUG
A 30 in 1 machine code tool and disassembler for your ZX81. **£6.95**

Improve your machine code programs with this new 48K Spectrum Assembler

Just released by Artic, this new professional quality assembler is also available for 16K ZX81 and features:—

• Word-processor-like text editor. • High-speed, versatile two-pass mnemonic assembler with labels and detailed error-trapping. Will assemble to any address. • Essential support facilities such as memory-edit, register inspect/modify and search for de-bugging. • Full output to ZX-printer. • Memory-status report and comprehensive user-manual.

ONLY £9.95

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NEW LOW PRICE ADVENTURE GAMES

ONLY £5.95 for ZX81 and £6.95 for SPECTRUM

INCA CURSE (Adventure B)
In a jungle clearing you come across an ancient Inca temple. Your mission to enter, collect the treasure and escape alive. But beware! Includes a cassette save routine.

SHIP OF DOOM (Adventure C)
You are unavoidably drawn to an alien cruiser. Can you reach the control room and free yourself? Or will they get you first? Includes a cassette save routine.

ESPIONAGE ISLAND (Adventure D)
While on a reconnaisance mission your plane loses control and you are forced to land. Can you survive and escape with the island's hidden secret?

PLANET OF DEATH (Adventure A) 16/48K
You find yourself stranded on an inhabited alien planet. Can you reach your ship and escape?

also available for SPECTRUM

ZX FORTH
Supplied on cassette with editor cassette, user manuals and keyboard overlay. ZX Forth combines the simplicity of basic with the speed of machine code now £14.95

THE ULTIMATE ADVENTURE FOR THE SPECTRUM/ZX81 for only £9.95

AND THE CHANCE TO WIN £10,000 or more IF YOU KRAKIT™

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Your eccentric father has left you £10,000 in his will. In order to claim your windfall you must solve twelve clues and gain access to a bank account in which the money has actually been deposited. Be the first to crack the puzzle and the prize is yours! Plus you will win two tickets to the city of the secret KRAKIT™ vault location. The Prize money is increased weekly. A telephone number will be supplied so you have the opportunity to find out just how much you could win.

DON'T MISS YOUR CHANCE TO WIN A FORTUNE!

SPECTRUM MICRO CHESS

The only Chess program for a 16K or 48K Spectrum. Allows all legal moves, castelling; en-passant and pawn promotion.
Options to play black/or white. Sets board in any position. Full colour and graphics display.

ONLY £6.95

new releases for 16K & 48K SPECTRUM

SPECTRUM INVASION FORCE

A popular arcade game for 16K or 48K Spectrum. Fires through the force field to destroy the menacing alien ship. Sounds easy?? Two levels of play — normal or suicidal. Full colour. Sound and hi-res. graphics.

NOW ONLY £4.95

A GREAT CHESS GAME FOR YOUR ZX81 OR SPECTRUM*

*SPECTRUM CHESS 48K

ZX CHESS I
Very popular machine code program, with six levels of play and an analysis option. Available for ZX81. **£6.50**

ZX CHESS II
A new improved version, with a faster response time, seven levels of play, analysis option and in addition a recommended move option. **£9.95**

ZX 1K CHESS
An incredible game in 1K for only **£2.95**
As featured on ITV

NEW **SPECTRUM VOICE CHESS**

This incredible program talks you through your game.
It tells you its move, recommends a move, and contains a range of facetious comments. The game is based on the highly successful ZX Chess II and is offered at the Christmas offer price of £9.95.

SPECTRUM CHESS now only **£9.95**

ALWAYS AHEAD WITH ZX81/SPECTRUM SOFTW. RE

Cheques & P.O. made payable to: Artic Computing Limited. Dealer enquiries welcome.
Please state whether your order is for ZX81 or Spectrum. Send S.A.E. (6in × 9in) for catalogue.

VISA

ARTIC COMPUTING LTD.

396 JAMES RECKITT AVENUE, HULL, N. HUMBERSIDE,

To: Artic Computing Ltd., 396 James Reckitt Avenue, Hull, N. Humberside, HU8 0JA.

Please supply.....

.....

.....

Cheque for total amount enclosed.

Name .....

Address.....

.....

HCW12

Top Ten programs for the VIC-20

1	Asteroids	Bug Byte (3)
2	Panic	Bug Byte (1)
3	Alien Blitz	Audiogenic (8)
4	Arcadia	Imagine (4)
5	Wacky Waiters	Imagine (2)
6	Cosmiads	Bug Byte (5)
7	Intro to Basic 1	Commodore (–)
8	Amok	Audiogenic (7)
9	Blitz	Commodore (6)
10	Intro to Basic 2	Commodore (–)

Compiled by Boots. Figures in brackets are last week's positions

Top Ten programs for the ZX81

1	QS Scramble	Quicksilva (2)
2	Mazogs	Bug Byte (5)
3	Night Gunner	Digital Integration (9)
4	Flight Simulation	Psion (1)
5	Monster Maze	New Generation (3)
6	Galaxians	Artic (4)
7	Chess	Psion (7)
8	Space Raiders	Psion (6)
9	Avenger	Abacus (8)
10	Asteroids	Silversoft (10)

Compiled by W. H. Smith. Figures in brackets are last week's positions

Top Ten programs for the Dragon-32

1	Donkey King	Microdeal (1)
2	Space War	Microdeal (3)
3	Planet Invasion	Microdeal (2)
4	Dragon Trek	Salamander (4)
5	Defense	Microdeal (5)
6	Alcatraz	Microdeal (6)
7	Chess	Dragon (7)
8	Grand Prix	Salamander (–)
9	Typing Tutor	Dragon (–)
10	Quest	Dragon (–)

Compiled by W. H. Smith. Figures in brackets are last week's positions

Top Twenty programs for the Spectrum

1	Flight Simulation	Psion (1)
2	Hobbit	Melbourne House (2)
3	Penetrator	Melbourne House (4)
4	Transylvanian Tower	Richard Shepherd (3)
5	3D Tanx	dk'tronics (14)
6	Planet of Death	Arcadia (13)
7	Horace Goes Skiing	Psion/M. House (6)
8	VU-3D	Psion (8)
9	Sentinal	Abacus (17)
10	Escape	New Generation (19)
11	Football Manager	Addictive (18)
12	Galaxians	Artic (16)
13	Chess	Psion (10)
14	VU-File	Psion (9)
15	VU-Calc	Psion (–)
16	Hungry Horace	Psion/M. House (7)
17	Battle of Britain	Microgame (–)
18	Planetoid	Psion (12)
19	Ground Attack	Silversoft (20)
20	Muncher	Silversoft (–)

More than just games for the VIC and 64

VIC-20 and Commodore owners who don't just want to play games take note. Marketing Micro Software has some new programs which could be right up your street.

Practicalc, a spreadsheet program along the lines of VU-Calc, will carry out mathematical calculations for you. It could be used to work out the best value for money from a range of insurance policies — or home computers, perhaps. According to MMS, it's the first spreadsheet available for the VIC and 64.

Composer will produce sound and notation for simple tunes, and Maths Duel is designed to develop childrens' mathematical skills.

Just for VIC-20 owners there's VIC Sketch, a graphics program which will create on-screen drawings in any of seven colours using keyboard or joystick. And VIC Pak is a cornucopia of useful programs, one to work out your mortgage, another to calculate your life expectancy, and five others too.

MMS's managing director Colin Aldridge said: "We feel there's a lot of scope for good business and educational programs that don't cost the earth. We're aiming at the home computing user with enough interest to get their machines doing something apart from playing Jellymonsters."

In June, he said, MMS would be launching further programs to back up Practicalc, including a word processor.

But just to show that it doesn't think computing is all work and no play, MMS has brought out five games for the Commodore machines. They are Barrel Jumper, Johnnie Jumpet, Reversal, Reflections, and Road Test.

Marketing Micro Software, Whitehouse Industrial Estate, Ipswich, Suffolk

Easier BASIC

A new version of BASIC, designed to be easier to use for beginners, has been launched by Digital Research.

But it costs £100 and is only available at present on the company's 16-bit family of operating systems, inlcluding CP/M-86 and Concurrent CP/M-86. It needs a disc system and at least 96K of RAM.

Paul Bailey, director of European operations, said Personal BASIC came with a step-by-step manual and checked for syntax errors while a program was being typed in, giving error messages in standard English.

Personal BASIC includes an editor and debugging aids, including statement number and variable tracing.

The new language costs £100 for one purchase with discounts for companies who want to include it in their own packages.

Digital Research (UK), Oxford House, Oxford Street, Newbury, Berks RG13 1JB

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TRIAD – Defend your base against the suicidal fleets of alien hoverships. The game is the space battle, Glaxions and you will need accurate control of your laser cannon to defend your base against constant bomb attacks. The best version of this exciting arcade game on the VIC 20. Double points, sheet flags and 5000 points bonus flags. Programmed in Fast Machine Code. Hi-Res Colour Graphics. Great sound effects. Joystick or keyboard control. ..... **Price £7.95**

GRIDTRAP – Your man has been placed on a grid of traps which open after he walks over them. His object is to reach and defuse a time bomb in less than 60 seconds. Further hazards are presented by a series of mines scattered around the grid which cannot be walked on and a wandering 'BOOT' which must be avoided. The more you play this one the harder it gets as more 'BOOTS' appear. Bonus flags are set around the grid when he walks over them and a bonus life at 100,000 points. Programmed in Machine Code. Hi-Res Colour Graphics and novel musical sound effects. Joystick or keyboard control. Progressive difficulty of play. ..... **Price £7.95**

ASTRO FIGHTERS – A Space duel for two players at once. Probably the only VIC 20 game of its type where one player uses the keyboard and the other a joystick. Each player must duel against his opponent and destroy his Astro Fighter. Each battle takes place in a different sector of space and the computer also plays against the two players by placing the ships amongst dangerous sectors of space. Programmed in Machine Code. Hi-Res Colour Graphics and exciting sound effects. Game time selection. Joystick essential. ..... **Price £6.95**

SCORPION – The scene is the desert and you must defend yourself from a trail of scorpions which wind their way down to your position through scores of poisonous cacti which give off deadly spores. As each scorpion is killed the trail breaks up and they attack individually as they reach you. The cacti must also be destroyed as they are giving cover to the scorpions. A deadly spider also makes its way across your path and must be out manoeuvred or destroyed. A very fast moving and exciting game programmed in Machine Code. Hi-Res Colour Graphics and sound effects. Joystick or keyboard control. ..... **Price £7.95**

SPACE RESCUE – The crew of a stranded survey ship have to be rescued from the surface of a remote planet by a shuttle craft from another ship. The shuttle has to be guided through a storm of meteors and landed on one of three landing pads where the crew may board. The return trip to the mother ship has to be completed while avoiding the meteors again. Your craft has a limited amount of laser power and some of the meteors can be destroyed as you pilot through the storm. You will have proved yourself a skillful pilot if you survive the trip and bring the whole crew back to the mother ship. A very good version of the popular arcade game written in Machine Code and using Hi-Res Colour Graphics and sound effects. Progressive difficulty of play. Operates from a Joystick or the keyboard. ..... **Price £6.95**

CHOPPER – The scene is a battle ground and you are the pilot of an attacking helicopter. Your task is to bomb tanks, trucks and gun emplacements and avoid their attacks of anti-aircraft fire and guided missiles. Your task is made harder by the steep sided valley of the battlefield. Programmed in Machine Code. Hi-Res Colour graphics and sound. Progressive difficulty of play and Joystick or keyboard control. ..... **Price £6.95**

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JUMPIN' JACK – Our very popular Frog game now on the 64 with numerous features. Snakes – Crocodiles – Lady Frog – Two player options – Multiple levels of play – Switch or analogue joystick operation – Keyboard operation – Sprite Graphics – Hi-Res Multicolour Mode Graphics – Synthy Sound. ..... **Price £9.95**

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LETTERS

Send your letters to Letters, Home Computing Weekly, 145 Charing Cross Road, London WC2 0EE. Don't forget to name your computer — the best letter could win £5-worth of software. Queries cannot be answered on this page

You asked for it, Mr Williams

Geoffrey Williams (One Man's View, HCW No. 10) appears to be as ignorant of the software industry as he is of ornithology (sparrows don't peck at milk bottle tops — bluetits do). For his information, the cost of producing a program on cassette is:

Cost of cassette: this varies, but after paying a professional artist to design an insert, get the inserts and cassette labels printed, have the tape professionally duplicated, packed and delivered, will be well over £1.50 per unit, even if you have several thousand produced.

Office rent: £3-5 per square foot.

Rates: Domestic ratepayers would be horrified to see our rates bill.

Electricity: again, business users pay more than domestic users.

Telephone: and again. You have to spend a lot of time on the phone in this business.

Wages: outside experts, office cleaning, other programmers, salespeople, office junior etc.

Computers: to adapt programs for 10 to 15 different computes, we need that number of machines, plus printers, cassette recorders, TVs etc. This represents a large capital investment.

Insurance: one delivery van, one sales vehicle, premises and equipment cost a lot to insure.

Advertising: £500-900 for one full colour page.

Miscellaneous: maintenance, stationery, furniture, petrol, postage, packing and depreciation.

The biggest item I have not yet mentioned — development cost. Suffice it to say that a programmer can earn up to £20 an hour in industry.

In short, if Mr Williams can develop and produce a program for £1.50, I wouldn't buy it.

I also find Mr Williams' attitude towards women particularly objectionable. I am not an ardent feminist, nor do I propose to launch into a tirade about attitudes. But look at it this way. Would Mr Williams be "asking for it" if he was robbed byh force of the books he offers for sale?

It's hardly reasonable to discuss the software industry in terms of an emotive and horrifying subject such as rape. Is Mr Williams one of those subhumans who think that all women are "asking for it" and like "it" really?

Jean Frost, Jaberwocky Software, Birmingham

Our software's not so costly

Peter Sweasey (issue 9) asked why our program **Black Crystal** costs £7.50. I would like to point out to him that the Black Crystal package contains two cassettes, making the cost of each cassette only £3.75. Each cassette contains three programs, making the cost of each program £1.25. At the present time there is no way we could reduce the price.

There are many amateur accountants around who think they know how to price games more than the software houses. Fortunately for them they are not in charge of a software house.

Geoffrey Williams in your One Man's View column in issue 9 tries to compare the music industry with computer games manufacturing. He states that a full-price LP retails at only £5.95 or thereabouts. I wonder how much that LP would cost if only one million record players existed in the world.

Software manufacturers that are going to survive will price their wares realistic. Not so cheap that they can't develop new products and not so expensive that they price themselves out of the market.

S.A. Galloway, Carnell Software, Slough

Put us in the picture

I think that all companies that produce software for computers should be made to follow in the footsteps of Romik in showing exactly what the screen looks like at some point of the game on the inlay card. This would show an honest picture of the game instead of some weird and elaborate drawing of something that never gets anywhere near the screen.

As well as this any advertisements should show what the screen looks like.

This might cut down the number of people who buy a cassette and then find they haven't got what they had expected from the elaberate drawings.

Simon Vincent, Dukinfield, Cheshire

Setting the listing straight

With regard to my Atari Character Generator program, published in issue no. 6, it appears that certain oddities have appeared in the listing. The corrections are as follows:

Lines 1120,2085,2140 — the character in quotes should be a diamond, gained by pressing control and full stop at the same time.

Line 6220 — the character in quotes is an inverse space.

Line 10120 — the character in quotes is a clear screen.

Also, in issue 7, my article on display lists appeared to lose the end of two lines. They are:

Line 20 — 20 DL = PEEK(560) + PEEK(-561)*256

Line 30 — 30 POKE DL,71:POKE DL+6,7

I hope this clears up any queries.

Marc Freebury, Reading

Shop around for your micro shop

I recently bought a 48K Oric-1, after many month of hard work, since I am still at school. The manual? is very skimpy on the subject of which cassette lead to buy, and the manager of the shop from which I bought the computer was even less helpful.

He firstly sold me the wrong lead, and then informed me that my cassette recorder was incompatible with the computer. So after even more saving. I bought a new recorder, but it still wouldn't work.

A new lead was purchased, but this only enabled me to save programs and not load them. The manager has now gone on holiday, and so there will be even more delay before I will be able to get the recorder to work properly.

So if you're thinking of buying a computer, make sure you buy from a shop where you will get good service, and where the shop assistants know what they're talking about.

Neil Clarke, Nottingham

Stripes on the borderline

Here is a program for the Spectrum that creates a multi-coloured, striped border.

```
10 PAPER 7: INK 0: BORDER 7
20 CLS
30 PRINT AT 1,5;CHR$ 127;"
1983 Andrew Wiseman"
40 PLOT 8,8: DRAW 239,0:
DRAW 0,150: DRAW -239,0:
DRAW 0,150: DRAW -239,0:
DRAW 0,-150
2: BORDER 3: BORDER 4:
BORDER 5: BORDER 6:
BORDER 7: BORDER 0:
PAUSE 1: GO TO 50
```

You can leave out most of the program; only line 50 is essential to make it work. It appears that PAUSE 1 causes the Spectrum to hold all the colours in line 50 on the screen at the same time.

Good luck with the continued success of the magazine.

Andrew Wiseman, Huntingdon, Cambs

ORIC-1 PROGRAM

Watch out — the Bloboids are trying to take over

The aliens multiply every time you make a move in Bloboids, a game for the Oric-1 by Kevin Wilson and Peter Slatter. Can you destroy them before they do the same to you?

You'll have to move carefully to avoid the Bloboids in our simple game for both models of the Oric-1.

At the start your spaceship is in the middle of the screen surrounded by six aliens.

Every time you move or fire another six appear. They'll colonise the screen unless you stop them.

Your job is to shoot as many as possible — they are each worth 10 points — before they surround and destroy your spaceship or you collide with them.

These are the keys to use:

1 left
2 right
3 down
4 up
9 fire

The game features high score, colour and sound effects.

Talking of sound effects, a ZAP may be inserted at the beginning of line 6008. We didn't put it in because we felt that, with all the explosions, it was already quite noisy.

Hints on conversion

Oric-1 BASIC is fairly standard so Bloboids should be easy to convert, except you will need to create your own aliens with another computer.

PLOT is the equivalent of PRINT AT, WAIT (line 1) would have to be replaced by a FOR-NEXT loop, GET means INKEY on most other computers and ? means PRINT.

```
0 CLS:PLOT 7,8,"I N S T R U C T I O N S":PLOT
  2,8,21:PLOT 35,8,23:PAPER7
1 PLOT 2,10,"1-LEFT,2-RIGHT,3-DOWN,4-UP,
  9-FIRE":WAIT700:CLS
2 PLOT2,10,"THE AIM OF THE GAME IS TO SHOOT AS "
3 PLOT 2,13,"MANY BLOBOIDS THAT APPEAR;BEWARE,"
4 PLOT 2,16,"EVERY TIME YOU FIRE OR MOVE AN"
5 PLOT 2,19,"EXTRA SIX BLOBOIDS APPEAR RANDOMLY."
6 PLOT 2,22,"SO CHOOSE YOUR MOVES CAREFULLY":WAIT900
7 X=10:Y=10
8 GOSUB 10000
9 CLS
10 PAPER 3:INK4
12 REM***POSITIONING AND PLOTTING BLOBOIDS***
13 A=INT(RND(1)*36)+2
20 B=INT(RND(1)*26)
30 C=INT(RND(1)*36)+2
40 D=INT(RND(1)*26)
50 E=INT(RND(1)*36)+2
60 F=INT(RND(1)*26)
70 G=INT(RND(1)*36)+2
90 H=INT(RND(1)*26)
100 I=INT(RND(1)*36)+2
110 J=INT(RND(1)*26)
120 K=INT(RND(1)*36)+2
130 L=INT(RND(1)*26)
500 PLOT A,B,"@"
510 PLOT C,D,"@"
520 PLOT E,F,"@"
530 PLOT G,H,"@"
540 PLOT I,J,"@"
550 PLOT K,L,"@"
555 REM***PLOTTING OUR SHIP***
560 PLOT X,Y,"<>"
570 GET Y$
580 PLOTX,Y,"  "
585 REM***MOVEMENT***
600 IF Y$="1"THENX=X-1
610 IFY$="2"THENX=X+1
620 IF Y$="3"THEN Y=Y+1
630 IF Y$="4"THEN Y=Y-1
640 IF Y$="9"THEN GOSUB6000
```

How it works

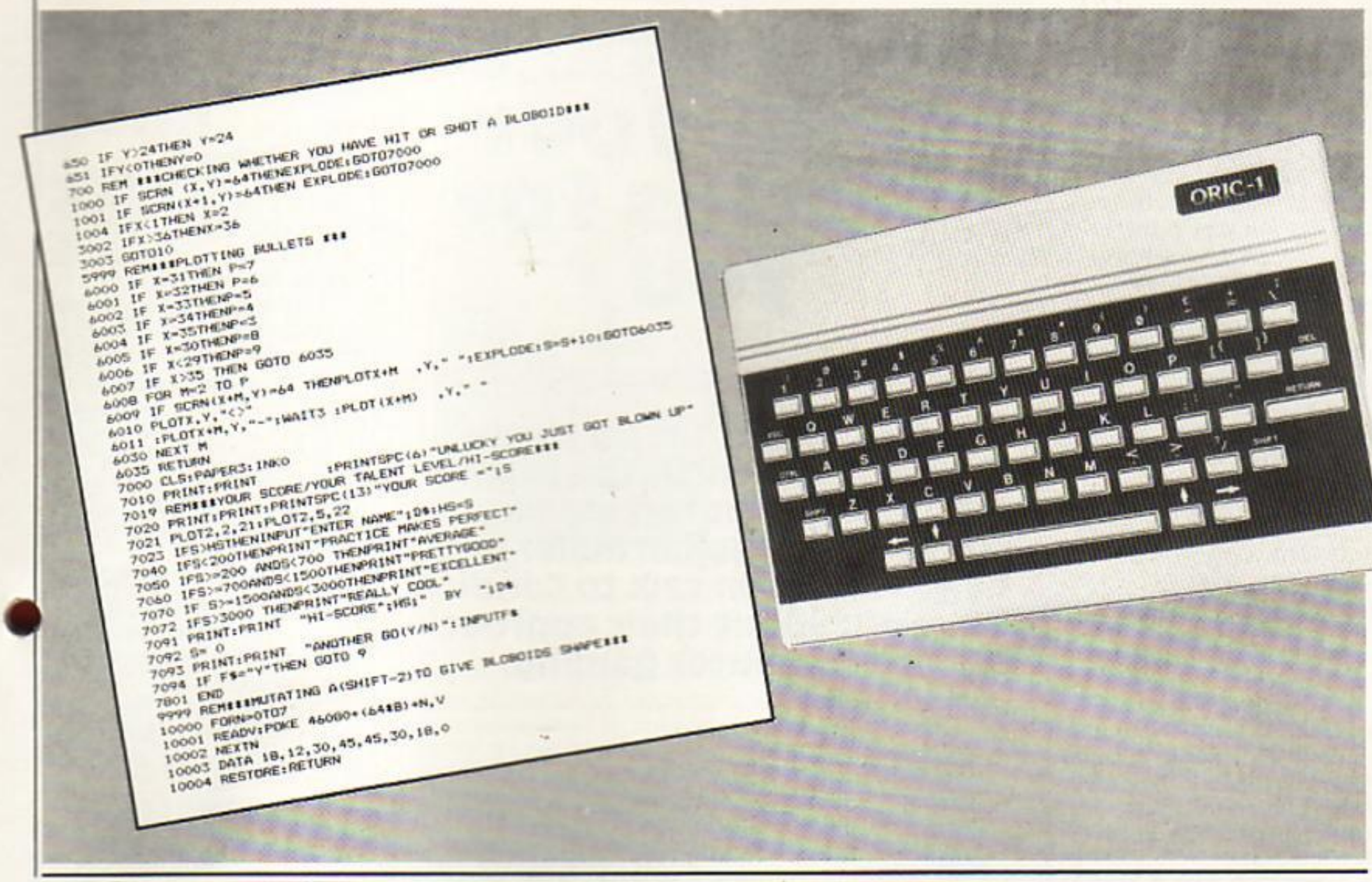
0-8 set up screen, instruction
12-550 position and plot aliens
585-640 movement of space ship
650-651 halts movement off screen in Y direction
700-1002 check if you have collided with or shot an alien
1004-3002 halts movement off screen in X direction
6000-6006 ensure bullets don't go off screen
6008-6035 plot bullets, check if they have hit alien
7010-7092 state you have been blown up, give score, state if score is new high score, ask for your name
7093-7801 another game? If Y, returns to start
9999-10004 create shape of bloboids out of shifted 2

Variables

Y$ holds the value of the key presses as you play
F$ checks for answer Y if you want another game

Sales director Peter Harding with the Oric-1

ORIC-1 PROGRAM



```
650 IF Y>24THEN Y=24
651 IFY<0THENY=0
700 REM ***CHECKING WHETHER YOU HAVE HIT OR SHOT A BLOBOID***
1000 IF SCRN (X,Y)=64THENEXPLODE:GOTO7000
1001 IF SCRN(X+1,Y)=64THEN EXPLODE:GOTO7000
1004 IFX<1THEN X=2
3002 IFX>36THENX=36
3003 GOTO10
5999 REM***PLOTTING BULLETS ***
6000 IF X=31THEN P=7
6001 IF X=32THEN P=6
6002 IF X=33THENP=5
6003 IF X=34THENP=4
6004 IF X=35THENP=3
6005 IF X=30THENP=8
6006 IF X<29THENP=9
6007 IF X>35 THEN GOTO 6035
6008 FOR M=2 TO P
6009 IF SCRN(X+M,Y)=64 THENPLOTX+M  ,Y," ":EXPLODE:S=S+10:GOTO6035
6010 PLOTX,Y,"<>"
6011 :PLOTX+M,Y,"-":WAIT3 :PLOT(X+M)  ,Y," "
6030 NEXT M
6035 RETURN
7000 CLS:PAPER3:INK0
7010 PRINT:PRINT          :PRINTSPC(6)"UNLUCKY YOU JUST GOT BLOWN UP"
7019 REM***YOUR SCORE/YOUR TALENT LEVEL/HI-SCORE***
7020 PRINT:PRINT:PRINTSPC(13)"YOUR SCORE ="!S
7021 PLOT2,2,21:PLOT2,5,22
7023 IFS>HSTHENINPUT"ENTER NAME";D$:HS=S
7040 IFS<200THENPRINT"PRACTICE MAKES PERFECT"
7050 IFS>=200 ANDS<700 THENPRINT"AVERAGE"
7060 IFS>=700ANDS<1500THENPRINT"PRETTYGOOD"
7070 IF S>=1500ANDS<3000THENPRINT"EXCELLENT"
7072 IFS>3000 THENPRINT"REALLY COOL"
7091 PRINT:PRINT  "HI-SCORE";HS;"  BY  ";D$
7092 S= 0
7093 PRINT:PRINT  "ANOTHER GO(Y/N)":INPUTF$
7094 IF F$="Y"THEN GOTO 9
7801 END
9999 REM***MUTATING A(SHIFT-Z)TO GIVE BLOBOIDS SHAPE***
10000 FORN=0TO7
10001 READV:POKE 46000+(64*8)+N,V
10002 NEXTN
10003 DATA 18,12,30,45,45,30,18,0
10004 RESTORE:RETURN
```


Prentice-Hall

computer books month

June '83

New and best-selling computer books published by Prentice-Hall and its associated imprints—Brady, Reston, Reward and Spectrum—will be on display throughout the country in June.

FEATURING–

The ZX Spectrum—Your Personal Computer

Ian McLean, Simon Rushbrook Williams & Peter Williams

Written in an informal, friendly style, this practical guide to the ZX Spectrum is ideal for first-time users. Clear diagrams show you how to master the Spectrum's keyboard and press the correct keys for various functions. Storing information, making calculations, sound, and graphics are carefully explained, and there is a special section on making music on the Spectrum.

£5.95 240 pages 13-985028-7 May 26th '83

Also on display will be books on the BBC Micro, IBM PC, Commodore 64, ATARI, VIC, Z-80, 6502, CP/M, UNIX, Interfacing UCSD Pascal . . .

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Programs to fight your battles for you

Red Shift was set up by two wargame enthusiasts to produce computerised games of strategy. Julian Fuller and Helmut Watson talk to Candice Goodwin about their approach to computer gaming

"We're into getting people sitting round computers in groups. I think arcade games are incredibly anti-social. What's the point of playing against computers when you can play against people?" So says Julian Fuller of Red Shift, a new company which is attempting to combine the best of traditional games of strategy with the best of computer gaming.

Red Shift is run by Julian Fuller and Helmut Watson, with a little help from various friends. Both are wargame enthusiasts who taught themselves programming while they were unemployed after dropping out of college.

Julian had been at North London Polytechnic's School of Independent Study doing a course in games design, but left after a year "because there were no teachers to teach it". Helmut studied maths, computer science and statistics.

Helmut has been playing wargames all his life — his father was in at the beginning of one of the first groups in the world. His father also taught Julian about wargaming, and that was how the two first met.

Red Shift started more or less by accident. Helmut and Julian started working on Miniature Wargames, a monthly wargaming magazine now into its second issue. Offices were needed for the magazine, and the premises they found, at 12C Manor Road, Stoke Newington, London N16, just happened to have a shop downstairs.

With help from the magazine's backer they opened Conflict, a shop selling board games, games of strategy, war game accessories — and a range of computer software. But they were not impressed with a lot of the software they saw, and so the idea of Red Shift was born.

Now Helmut concentrates on programming, while Julian writes for the magazine and takes care of the busines side of all three businesses — the magazine, the shop and the software company.

Red Shift's first program — Time Lords, a "five person, five dimensional game" for the BBC B — has been on the market for just over a month now. It was written mainly by two programming friends, and "tidied up" by Helmut and Julian.

The concept of the game is completely original, and it could take hours or days to play. Each player takes the role of Time Lord for one of the five races of the universe, and must fight battles and use cunning to defeat the other four. Players can move backwards and forwards in time, setting time traps for each other and changing the course of history.

Julian said: "It's selling OK, but I've got to go out and do some legwork to promote it". But Time Lords has already made a deep impression on one customer at least. Helmut says he sold one to a man who didn't even have a BBC Micro.

Helmut Watson — a wargamer all his life

"I think he's going to buy a micro just so he can play Time Lords", he said.

Red Shift's next game, due on the market in about a month, will be Apocalypse, a version of a classic board game of strategy adapted for the 48K Spectrum. Apocalypse is a bit like games such as Diplomacy and Risk, and involves trying to take over the world by deploying troops and fighting battles to gain territory.

The computer version will be basically similar to the board game, but computerisation will speed up "housekeeping" aspects like calculating the number of "revenue points" that determine the value of the players' territory.

It will also offer up to nine ways of attacking, instead of the board game's six. As well as armies and missiles, the player will also be able to use ships.

Helmut and Julian are also working on programs designed to be used alongside rather than instead of a board-based game. This is because, for the dedicated wargamer, there are some things a micro can never replace: the realistic model armies and towns used in the games are an important part of the wargame's mystique.

But they feel the computer could have a role in cutting out a lot of the laborious calculations that arise from the wargames' highly complex rules.

Helmut said: "Using computer moderators to run battles could speed up the game and make it more realistic, because more factors could be taken into account. On the other hand, it might not speed the game up at all, because you could spend mor time thinking out what to do next".

Compared to arcade games, selling games of strategy is uphill work.

"It's quite a specialised market", Julian said. There is also a certain amount of consumer resistance to be overcome ▶

because "you can't just sit down and play games of strategy for five minutes. It takes a while to learn — although the enjoyment lasts forever".

Then there are the technical snags to be overcome. Strategic games use a large database, so memory — or the lack of it — is a constant problem. Using more machine code would help, but because the games tend to be extended and adapted as they go along, it is easier to write them in BASIC.

The original computer games of strategy didn't have this problem because they were written for large computers with access to disks. Red Shift is eagerly awaiting the arrival of low-priced disk systems for home micros — particularly the Spectrum. "The Microdrive will make a big difference" Julian said. "You can't do games of strategy properly on cassette".

Both Julian and Helmut come in for a lot of criticism over their interest in wargames, but they feel that the attacks on their hobby are unfair.

Julian said: "If anyone hates war, it's war gamers, because they know what it's all about. They know how devastating the effects can be. A higher proportion of wargamers are pacifists than in the community at large."

Julian Fuller

According to Helmut: "There's an educational element too. I've got an extensive knowledge of military history because of wargames. They have to be realistic, so you have got to do a lot of research — and that goes for science fiction games, too".

To finally silence the critics, Red Shift is planning to bring out a game of "international intervention". It is being designed on the office Apple, using a Visicalc package, but will be sold for the BBC, Spectrum and possibly the Dragon too.

The object of the game? To maintain world peace.

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Find the facts fast with a Dragon database

You'll find uses for this database both at home and at work, say writers John Sharp and David Bolton

You could use our Dragon Database program to keep track of your record collection — and the character search feature makes it easy to find an entry fast.

It could also be used in a small business to store customers' names, addresses and purchases or to keep a stock list.

The program is essentially a series of sub-routines to handle to seven functions in the menu. Each is independent, so the program would run without a particular sub-routine provided no attempt is made to access it.

After typing in the basic program, up to line 230, you can test each sub-routine in turn by entering sample data and checking that the results are what you would expect.

You could add to the program by displaying the number of records which have been entered, titling the fields, sorting on the surname and, if you have a printer, make the database into a mailing program to print address labels.

```
5 CLEAR 5000 : DIM A$(100,10)
10 CLS : PRINT @ 12,"DATABASE"
20 PRINT : INPUT "ENTER NO OF IT
EMS"; N
30 PRINT : INPUT "ENTER NO OF FI
ELDS PER ITEM"; F
40 IF N > 100 OR F > 10 THEN 10
100 CLS : PRINT @ 12,"DATABASE"
110 PRINT @ 70,"1 ENTER INFORMAT
ION"
120 PRINT @ 102,"2 DISPLAY RECOR
DS"
130 PRINT @ 134,"3 SEARCH DATA"
140 PRINT @ 166,"4 SORT DATA"
150 PRINT @ 198,
    "5 SAVE DATA"
160 PRINT @ 230,
    "6 LOAD DATA"
170 PRINT @ 262,"7 END"
200 PRINT @ 326,"SELECT-" ; : CH
OICE = VAL (INKEY$)
210 IF CHOICE = 0 THEN 200
220 ON CHOICE GOSUB 1000,2000,30
00,4000,5000,6000,7000
230 GOTO 100
1000 CLS : INPUT "UPDATE WHICH R
ECORD"; X
1010 IF X = 0 THEN RETURN ELSE I
F X > N THEN 1000
1020 DI = -1 : PRINT @ 64,"RECOR
D" ; X
1030 FOR J = 1 TO F : PRINT @ 74
,"FIELD" ; J
1040 PRINT @ 128, A$(X,J)
1050 PRINT @ 192,"" : PRINT @ 19
2,"";
1060 INPUT D$
1070 IF D$ = "" THEN NEXT ELSE A
$(X,J) = D$ : NEXT
1080 PRINT @ 288,"HIT SPACE BAR
FOR NEXT RECORD" ;
1090 K$ = INKEY$ : IF K$ = "" TH
EN 1090
1100 IF K$ = " " THEN X = X+1 :
CLS : PRINT @ 288,"" : GOTO 1010
 ELSE GOTO 1000
2000 IF NOT DI THEN CLS : PRINT
@ 203, "NO RECORDS" ; : FOR DLY
= 1 TO 500 : NEXT : RETURN  ELSE
 CLS : X$ = "" : PRINT @ 0,"DISP
LAY WHICH RECORD ?" ;
2010 PRINT @ 22,X$ ; : K$ = INKE
Y$ : IF K$ = "" THEN 2010 ELSE I
F K$ <> CHR$ (13) THEN X$ = X$ +
 K$ : GOTO 2010
2020 X = VAL(X$) : PRINT @ 22,""
2030 IF X = 0 THEN RETURN ELSE I
F X > N THEN 2000
2040 PRINT @ 64,"RECORD" ; X : P
```

Hints on conversion

Dragon BASIC is fairly standard and should convert quite easily to other computers. If yours does not have the IF...THEN...ELSE command you will have to use IF...THEN and follows it by the not equals command.

The hash symbol followed by −1 means go to the tape recorder and, if equipped with remote, it will turn it on and off where necessary. Otherwise it will remain on. INKEY in some lines could be replaced with GET.

● This program is taken from The Power of the Dragon, published at £5.95 by Microsource, 1 Branch Road, Park Street, St Albans, Herts

How it works

5 reserves memory, dimensions array A$ for maximum number of records, fields

20-40 enter number of items and fields per item, check for maximum value

100-230 clear screen, display menu, request option, select sub-routine, return if choice invalid

1000-1020 start of update sub-routine select record, check validity, set variable DI (Data In) for use by other sub-routines, display record number chosen

1030-1070 loop executed for each field, contents printed by line 1040

1050-1080 clear line for update, input update, if return pressed get next field, press space for next record

1090-1100 wait for key press, check for space bar

2000-2040 start of display sub-routine, check variable DI for data (if none return to menu), clear screen, request record, clear X$ to store input, display record number, check validity, print record number, display field

2060-2090 wait for key press, if up arrow display preceding record, down arrow for next record, if neither find record starting with key pressed

3000 start of search sub-routine check for data, clear screen, zero variables

3010-3040 choose leading character of embedded character search

3050-3070 select range of records to be searched and which field

3080-3100 confirm values are valid, input search string

3110-3131 start FOR-NEXT loop to search each record, using INSTR to search left-most part of fields; if found go to 3500, bypass embedded string search

3140-3190 search for string, print message if unsuccessful and return to menu

4000-4050 start of sort sub-routine, check for data, clear screen, select record range and field, check validity

4060-4200 check if record is empty, look at each record in turn and reverse position if sort field has higher value than the next, display "sorted", short delay, return to menu

5000-5080 start of sub-routine to store data on tape, test for data, print title, ask for file name, set up tape recorder, say data is being saved

5090-5180 open file to be output, write to tape, save each record and field, close file, tell user, wait for response, return to menu

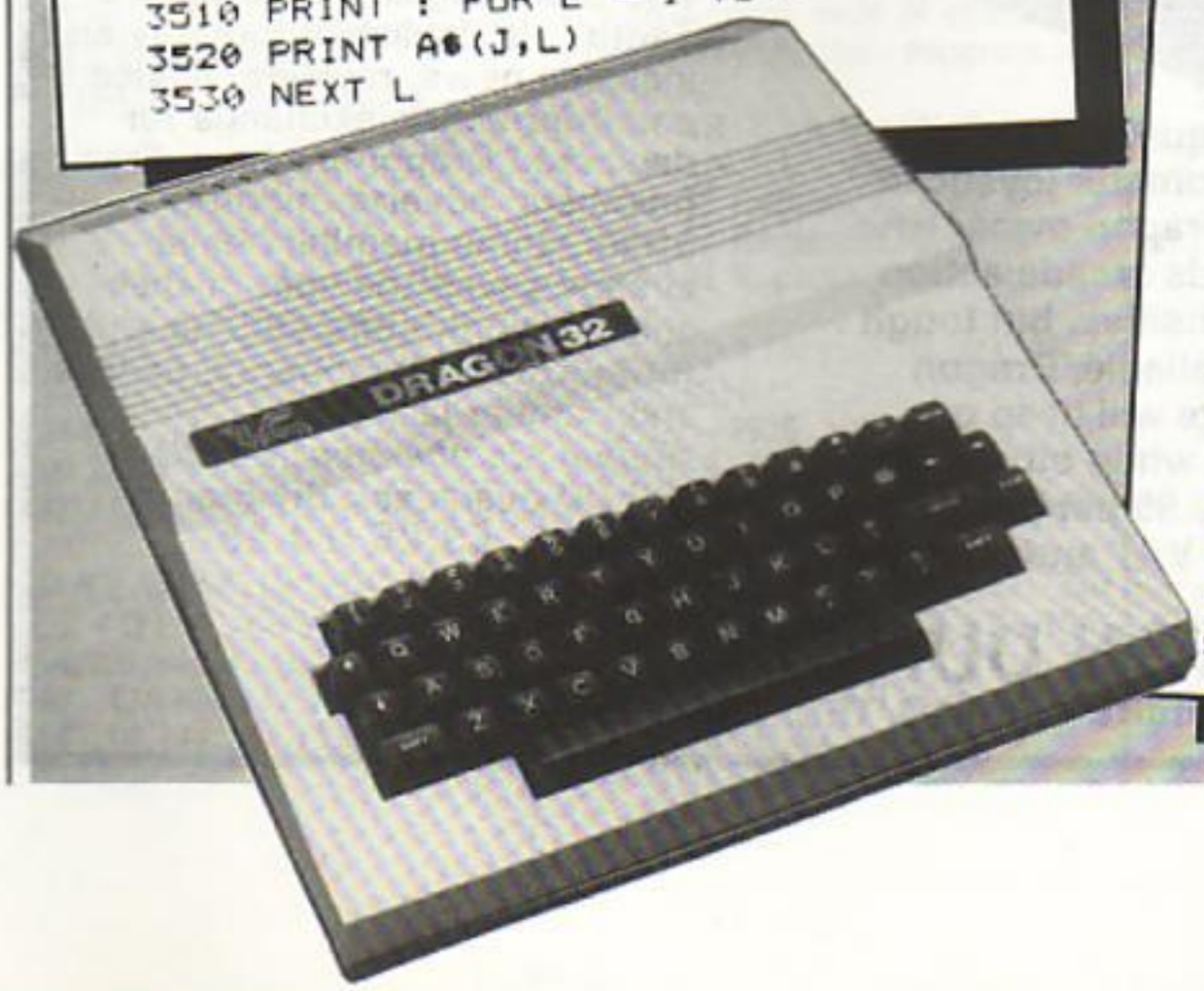
6000-6170 sub-routine to bring data back into computer, essentially the reverse of sub-routine starting at line 5000

DRAGON PROGRAM

```
RINT : FOR J = 1 TO F
2050 PRINT A$(X,J) : NEXT
2060 K$ = INKEY$ : IF K$ = "" TH
EN 2060
2070 IF K$ = CHR$(94) THEN X = X
-1 : GOTO 2030
2080 IF K$ = CHR$(10) THEN X = X
 + 1 : GOTO 2030
2090 X$ = K$ : GOTO 2010
3000 IF NOT DI THEN CLS : PRINT
@ 203, "NO RECORDS" : FOR DLY =
1 TO 500 : NEXT : RETURN ELSE CL
S : TYPE = 0 : FLAG = 0 : FOUND
= 0
3010 PRINT @ 66,"1 LEADING CHARA
CTER SEARCH"
3020 PRINT @ 98,"2 EMBEDDED CHAR
ACTER SEARCH"
3030 PRINT @ 166,"SELECT-" ; : K
$ = INKEY$ : IF K$ = "" THEN 303
0 ELSE TYPE = VAL(K$) : PRINT TY
PE
3040 IF TYPE < 1 OR TYPE > 2 THE
N 3000
3050 PRINT @ 228 : PRINT @ 228,"
SEARCH FROM RECORD NO" ; : INPUT
 RS
3060 PRINT @ 260 : PRINT @ 260,"
SEARCH TO RECORD NO" ; : INPUT R
F
3070 PRINT @ 292 : PRINT @ 292,"
SEARCH WHICH FIELD" ; : INPUT S
3080 IF RS > N THEN 3050 ELSE IF
 RF > N THEN 3060
3090 IF S > F THEN 3070
3100 PRINT @ 356,"SEARCH FOR-" ;
 : INPUT SK$
3110 CLS : FOR J = RS TO RF
3120 IF INSTR (1, A$(J,S),SK$) =
 1 THEN GOSUB 3500 : IF FLAG =
1 THEN RETURN
3130 IF TYPE = 1 THEN 3150
3140 IF INSTR (1, A$(J,S), SK$)
<> 0 THEN GOSUB 3500 : IF FLAG =
 1 THEN RETURN
3150 NEXT J
3180 IF FOUND=0 THEN PRINT@235,"
NOT FOUND":FOR DLY=1 TO 250:NEXT
 DLY
3190 RETURN
3500 FOUND = 1 : CLS : PRINT"REC
ORD" ; J
3510 PRINT : FOR L = 1 TO F
3520 PRINT A$(J,L)
3530 NEXT L
```

```
3540 PRINT @ 489,"PRESS ANY KEY"
 ;
3550 IF INKEY$ = "" THEN 3550 EL
SE CLS : RETURN
4000 IF NOT DI THEN CLS : PRINT
@ 203, "NO RECORDS" : FOR DLY =
1 TO 500 : NEXT : RETURN ELSE CL
S
4010 INPUT "SORT FROM RECORD NO"
; RS
4020 INPUT "SORT TO RECORD NO";
RF : IF RF = 0 THEN RF = N
4030 INPUT "SORT ON WHICH FIELD"
; S
4040 IF RS > N THEN 4000 ELSE IF
 RF > N THEN 4000
4050 IF S > F THEN 4000
4060 IF A$(RF,S) = "" THEN RF =
RF - 1 : GOTO 4060
4100 FOR J = RF - 1 TO RS STEP -
1
4110 FOR K = 1 TO J
4120 IF A$(K,S) <= A$(K+1,S) TH
EN 4180
4130 FOR L = 1 TO F
4140 T$(L) = A$(K+1,L)
4150 A$(K+1,L) = A$(K,L)
4160 A$(K,L) = T$(L)
4170 NEXT L
4180 NEXT K
4190 NEXT J
4200 PRINT "SORTED" : FOR DLY =
1 TO 250 : NEXT DLY
```

```
4210 RETURN
5000 REM SAVE ROUTINE
5010 IF NOT DI THEN CLS : PRINT
@ 203, "NO RECORDS" : FOR DLY =
1 TO 500 : NEXT : RETURN ELSE CL
S : PRINT @ 11, "SAVE DATA"
5020 PRINT @ 106, "SAVE AS:-"
5030 PRINT @ 138," " ; : INPUT N
AME$
5040 CLS : PRINT @ 96,"READY TO
SAVE " ; NAME$
5050 PRINT : PRINT "PUT TAPE IN
RECORDER" : PRINT "PRESS RECORD/
PLAY ON RECORDER."
5060 PRINT "WHEN READY PRESS <EN
TER>."
5070 IF INKEY$ = "" THEN 5070
5080 CLS : PRINT @ 100,"SAVING "
 ; NAME$
5090 OPEN "O",#-1,NAME$
5100 PRINT#-1,N : PRINT#-1,F
5110 FOR ITEM = 1 TO N
5120 FOR FIELD = 1 TO F
5130 PRINT #-1,A$(ITEM,FIELD)
5140 NEXT FIELD,ITEM
5150 CLOSE #-1
5160 CLS : PRINT @ 100," SAVED "
 ; NAME$
5170 PRINT @ 420, "HIT ANY KEY T
O CONTINUE"
5180 IF INKEY$ = "" THEN 5180 EL
SE RETURN
```



DRAGON PROGRAM

```
6000 REM LOAD ROUTINE
6010 CLS : PRINT @ 11 ,"LOAD DAT
A"
6020 PRINT @ 96, "NAME OF FILE T
O BE LOADED"
6030 PRINT @ 138,"";:INPUT NAME$
6040 CLS : PRINT @ 96,"READY TO
LOAD " ; NAME$
6045 IF NAME$="" THEN 6000
6050 PRINT : PRINT "PUT TAPE IN
RECORDER" : PRINT "PRESS
PLAY ON RECORDER."
6060 PRINT "WHEN READY PRESS <EN
TER>."
6070 IF INKEY$ = ""THEN 6070
6080 CLS : PRINT @ 100,"LOADING
" ; NAME$
6090 OPEN "I",#-1,NAME$
6100 INPUT #-1,N : INPUT #-1,F
6110 FOR ITEM = 1 TO N
6120 FOR FIELD = 1 TO F
6130 INPUT #-1,A$(ITEM,FIELD)
6140 NEXT FIELD,ITEM
6150 CLOSE #-1
6160 CLS : PRINT @ 100,"LOADED "
 ;  NAME$
6170 DI = -1
6180 PRINT @ 420, "PRESS ANY KEY
 TO CONTINUE."
6190 IF INKEY$ = "" THEN 6190 EL
SE RETURN
7000 CLS : END
```

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Take a tip for your micro

Here's a selection of bright ideas for you to try out

Make a beep VIC-20

An interesting feature of the Sinclair Spectrum is the small click from the speaker when you press a key on the keyboard. The following routine will allow the VIC-20 to do this.

The routine uses sound location 2 (location 36875). This means that any program which uses sound could be affected while this routine is active. You can disable the routine by pressing STOP/RESTORE. The routine is initialized with SYS 830.

The routine is located in the cassette buffer starting at location 830. Listing 1 is the 6502 assembler code and listing 2 is a BASIC loader for the routine.

Listing 1

```
START : 830
LDA     788
STA     826
LDA     789
STA     827
LDAIM   0       initialize
STAZ    254     routine
LDAIM   89
STA     788
LDAIM   3
STA     789
RTS
LDAIM   0
STA     36875   switch off
LDAZ    197     click
CMPZ    254
PHA             do a click?
BEQ     14
CMPIM   64
BEQ     10      no
LDAIM   240     character?
STA     36875
LDAIM   10
STA     36878   make a click
PLA
STAZ    254
JMPIA   826     end from
                routine
```

Listing 2

BASIC loader for the beep on a key pressed routine.

```
10 DATA 173,20,3,141,58,3,
173,21,3,141,59,3,169,0,133,
254
20 DATA 169,89,141,20,3,169,
3,141,21,3,96,169,0,141,11,144
3 0
DATA 165,197,197,254,72-
, 2 4 0 ,
14,201,64,240,10,169,240
40 DATA 141,11,144,169,10,
141,14,144,104,133,254,108,58,
3
50 FOR I = 830 TO 888 : READ
J : POKE I,J : NEXT I
60 SYS 830
70 REM *** Your program ***
```

The storage locations used by the routine are:
254 = last character pressed
826-827 = indirect jump address for hardware interrupt.

Kevin Irving

Algebra made easy VIC-20

This short program will help readers struggling to do their algebra homework. It enables you to plot a graph of an algebraic function, simply and quickly.

You type in the function to be plotted in line 80 — here it shows the function Y = (X − 2) * (X + 2). Line 81 is used here to stop any values of Y greater than 10 being generated, as these will be off the screen and could lead to the program crashing.

The graph will be displayed for a few seconds only. But you can see it again and again by pressing key F7.

Though this program is designed for the VIC-20, it would be easy to adapt for other machines. The VIC has a screen of 23 lines, each line 22 characters long. For a machine with L lines each N characters long, alter the program as follows:

18 FOR Z = − (N * L / 2) to (N * L / 2)STEP N
Line 35 Replace 22 with N
Line 52 Replace 22 with N
Line 81 Replace 10 with L / 2

```
2  PRINT " CLEAR
SCREEN "
12 X1 = 7929: X2 = 7928: POKE
36879,8
17 For Z = −4 TO 15: POKE
X2 + Z, 64: NEXT
18 FOR Z = −220 TO 220
STEP 22: POKE X2 + Z, 106:
NEXT
30 FOR X = −4 TO 15
33 GOSUB 80
35 P = (X1 + X) − 22*Y
36 POKE P, 42
40 NEXT X
45 FOR T = 1 TO 4000: NEXT
50 FOR X = −4 TO 15
51 GOSUB 80
52 P = (X1 + X) − 22*Y
54 POKE P, 32: NEXT
60 GET A$: IF A$ = "" THEN
60
61 IF A$ = "F$" THEN 2
63 GOTO 60
80 Y = (X − 2)*(X + 2)
81 IF Y  10 THEN Y = 10
82 RETURN
```

Chris Cattanach

Cure that wobble ZX81

I've used this cheap cure for ZX81 RAMpack wobble successfully for about a year now.

The main cause of wobble trouble is that each time you press a key, the connections between the ZX81 and the RAMpack flex because they both touch the table.

My answer is to raise the RAMpack by raising the back of the ZX81, and by improving the fit of the connector.

This is how to do it:

1. Fix a strip of half-round rubber across the underside of the ZX81 using double sided adhesive tape. The rubber I used is about ⅜" thick and is the kind used in metal door frames. The actual thickness is not critical, provided the RAM pack clears the table comfortably. The strip fits just behind the rear rubber feet.
2. Find a piece of file binder which is used to grip papers. It has a cross section like a U shaped channel and the paper is gripped in the channel. It should be about ½" wide. Cut a piece off and fit it so that it goes into the ZX81 connector slot and grips the lower edge.
3. Fit a piece of ½" wide self-adhesive rubber foam across the RAM pack just above the connector to act as a cushion.
4. Clean the contacts at the back of the ZX81 with a little meths on a cotton bud, till they are bright. Then push the RAM pack into place taking care not to use force. It should be a close fit and grip nicely.
5. New connect up TV and power. If the K cursor does not appear, then go back to instruction 4.
6. Key in PRINT PEEK 16389/ Newline; 128 should be printed. If not go back to instruction 4.

Geoffrey Genever

Found! AND and OR Sharp MZ-80K

Have you ever wondered why the logical operators AND and OR are not supported in Sharp Basic SP 5025? Well, although it's well hidden, the Sharp manual does give the answer for MZ-80K owners on Page 113.

It all revolves around the famous Boolean Logic — don't run away! It's not as complicated as it sounds...and the famous AND and OR **are** available to Basic SP 5025 users.

The * is a logical multiply (AND) whilst the + is a logical add (OR).

For the logical operator AND, the resultant condition will be true if the first condition and all other conditions are true. If either of the conditions are false, then the resultant condition will be false.

The rule for the logical operator OR is: the resultant condition is true if either the first or any subsequent condition is true.

Now — most logical operators are found within IF/THEN statements so for lines like:

100 IF A 6 AND B = 0 THEN 1200

substitute

100 IF (A 6) * (B = 0) THEN 1200

Always remember that the arguments MUST be enclosed in brackets.

You can have logical AND and OR in the same line

100 IF (A 6) * (B = 0) + (A 6) * (B = 1) THEN 1200

is Basic SP 5025 for

100 IF (A 6 AND B = 0) OR (A 6 AND B = 1) THEN 1200

Ian Higton ■

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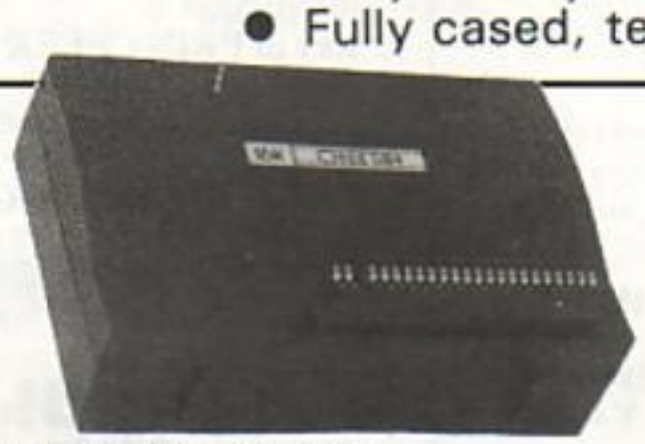

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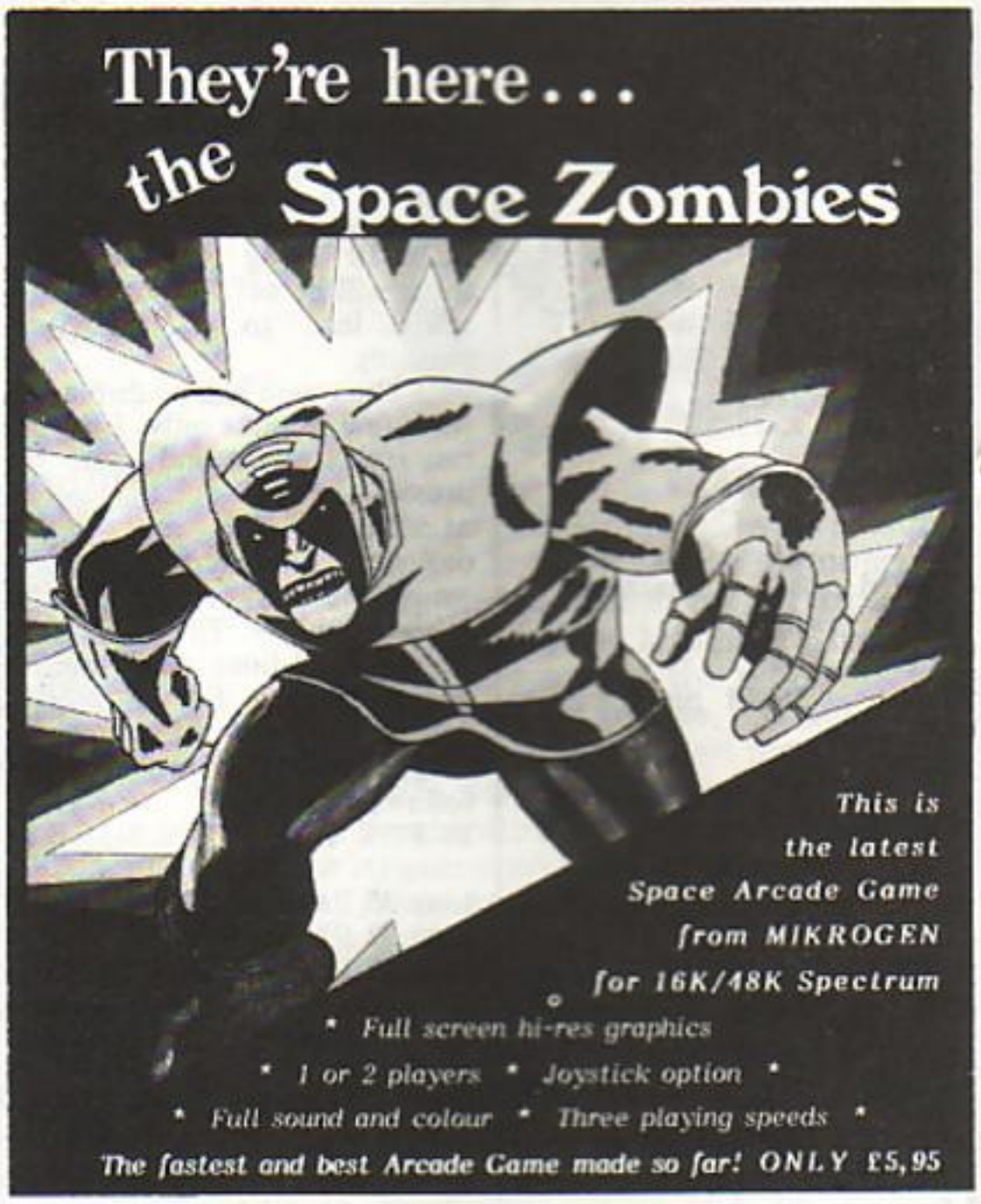

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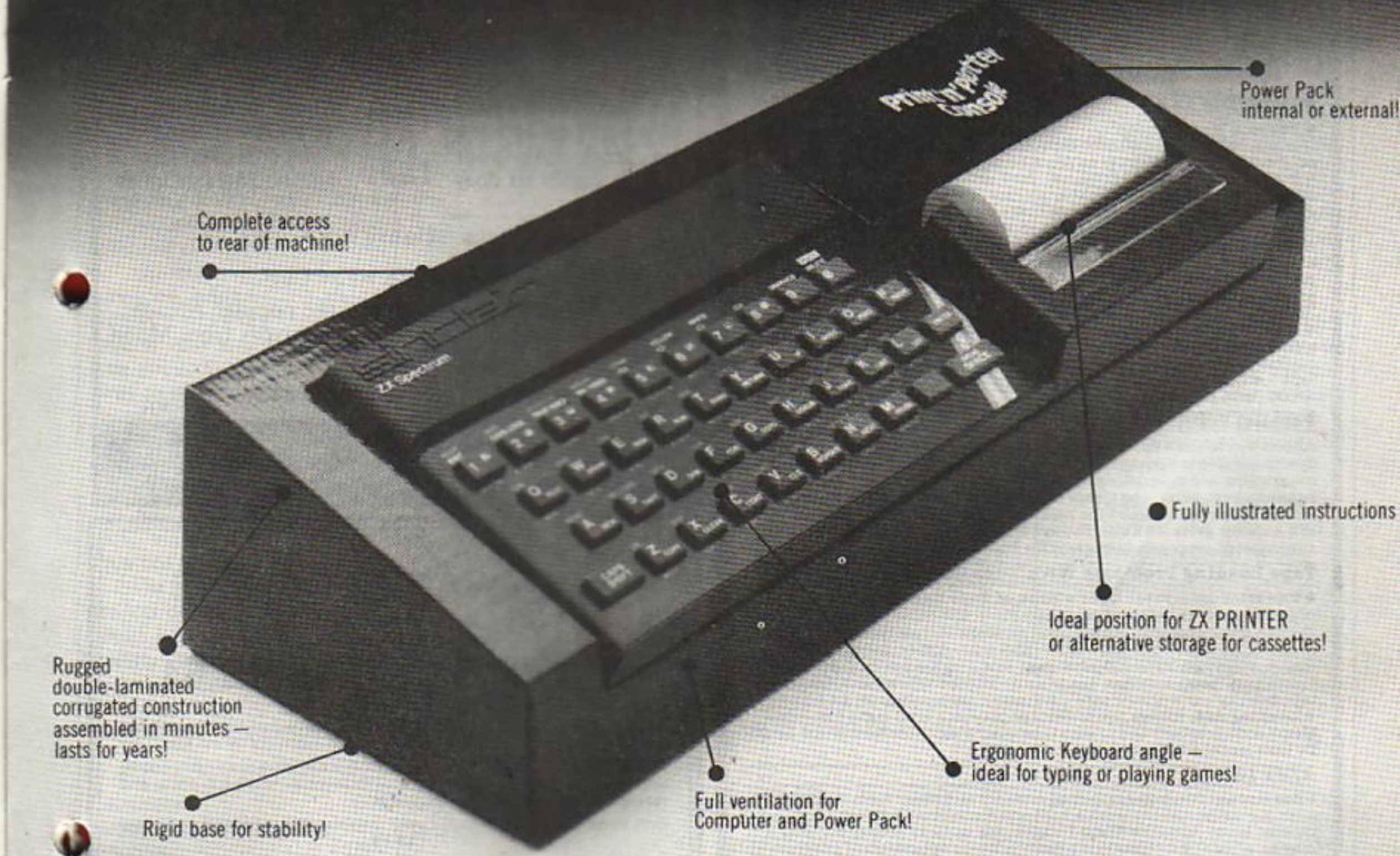

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ZX81 16K

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Alien Mine £4.99

IE Applications, 177 Castleton Road, Mottingham FE9 4DE.

Anything for which the instructions include the line "Cheats Sometimes Prosper!" has to be worth a look.

Alien Mine has you digging for jewels beneath a planet surface while a tank shoots away at your base hut, behind a pile of stone blocks which will fall on you at the earliest opportunity.

If that isn't bad enough, the tunnels you dig are inhabited by wandering nasties who follow you around trying to end your miserable existence!

On-screen presentation is very good, being a flat cross sectional drawing of the underground area around your start point. You have to tunnel away to reach the jewels buried beneath.

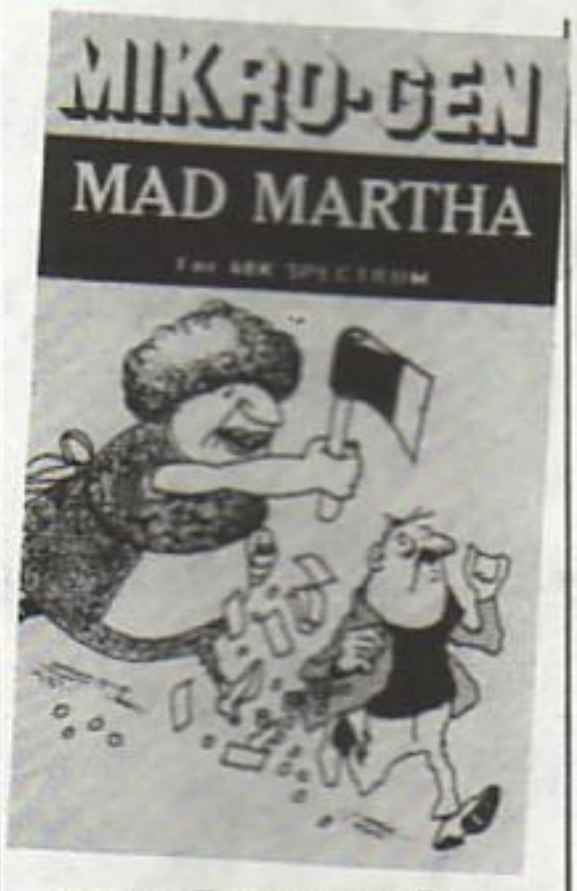
Instructions are sparse — you are supposed to work it out for yourself, apparently. Which you will do once you've been shot, buried, eaten alive and squashed a few times.

For a very simple game there are lots of ways to die in Alien Mine! I found it good fun and cleverly written. It will not go stale easily and the key layout is fairly easy to use. All in all, highly playable and recommended.

R.H.

instructions	0%
playability	80%
graphics	75%
value for money	75%

★★★★



Mad Martha 48K £6.95

Mikro-Gen, 24 Agar Crescent, Bracknell, Berks

God help the designer if Womens Lib ever get hold of him'! Mad Martha is a domestic adventure game. The task is to escape the house and get into town for a night on the tiles.

Failure to clear the marital home quietly awakens the wife who proceeds to chop you up into cat meat! A neat little graphic routine cheerfully depicts the dismembering of husband Henry. (Nothing gory — honest).

The game itself is a Hobbit-type text/graphics mixture, wherein you are given a hi-resolution picture of your present surroundings and progress — or not — by entering commands such as "GET MATCHES" etc.

The program understands a fair number of words and is very easy to communicate with.

R.H.

instructions	75%
playability	75%
graphics	75%
value for money	85%

★★★★

Maze Panic £4.95

Silicon Software, 24 Short Lane, Stanwell, Middlesex

Frogger meets Pacman. In part one of this game you use the cursor key to guide Thomas Frog from bottom to top of the screen through a maze of slowly moving barge-shaped barriers.

Master this and you graduate to more advanced problems. Once again you have to climb the screen, but this time the maze takes a different form. It's not unlike a Pacman maze, which slowly narrows to make it harder and harder for you to gobble up the power points which are dotted about.

This second stage is really quite difficult, and your admittedly less than nimble-fingered reviewer came nowhere near succeeding, so there's enough challenge to ensure the game's appeal will last.

Points are awarded during each part of the game, and a highest-score record is kept.

One particularly nice feature: you can examine the Basic program in order to make your own improvements, and each maze can be saved as a separate game.

D.J.

instructions	70%
playability	65%
graphics	65%
value for money	70%

★★★

Space Raiders £4.95

Psion, 2 Huntsworth Mews, Gloucester Place, London NW1 6DD

A good version of the ever-popular Space Invaders. Well-designed, smooth graphics, with an effective sound accompaniment.

You start with three guns, and another gun is said to be available after 1,000 points. To verify that, though, more expert hands than mine would have to operate the controls, which are the Z and X keys for dodging right and left, and the space key for firing.

Both the current and the high score are shown.

Though the principle of this game is well established by now, this implementation is particularly good. Worth the money on that basis alone.

D.T.

instructions	85%
playability	90%
graphics	90%
value for money	80%

★★★★

Scramble £5.50

Mikro-Gen, 24 Agar Crescent, Bracknell, Berks

This game presents you with an impressive menu, but the meal to follow is rather mediocre — a bit like ordering a Crepe Suzette in a five star hotel and being served a pancake with orange juice!

After loading, you are presented with a selection of speeds ranging from slow through normal to fast, and a choice of Missiles, UFOs, Meteors or the Fortress and Base.

I duly did battle with all of the above-mentioned hazards at all the aforementioned speeds, but still could not whip up any enthusiasm for a second helping.

As an introduction to this type of game, maybe — though what an inexperienced player would make of the plane ploughing through mountains without any apparent damage I can't imagine. **B.B.**

instructions	85%
playability	60%
graphics	70%
value for money	55%

★★

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Poppy Programs, Richmond House, Ingleton, Carnforth, Lancs LA6 3AN

The tape was supplied with a photocopied insert which contained brief but adequate typewritten instructions. Both programs loaded easily but did not auto-run — a disadvantage with programs for use with children. Good graphics, but only minimal use was made of colour and sound.

Time displays a clock face and asks you to type in the time in word form. Several variations are accepted — six twenty, twenty past six etc — although only a set answer is given. I think a child aged between four and six (the age range the programs are written for) would find the reply "Yes, twenty five to eleven" to an entry of "ten thirty five" rather confusing.

Money shows pictures of various coins and asks the user to enter the different coin needed to make up a stated amount. The coins were confusing at first but soon became easily recognisable.

Both programs had a value as a repetitive exercise. But for much less, you could buy a set of imitation coins and a clock face which would do the job just as well.

R.E.

instructions	80%
playability	68%
graphics	93%
value for money	40%

★ ★

Garden Birds £6.50

Hilton Computer Services, 14 Avalon Road, Orpington, Kent BR6 9AX

Was that **really** an Egyptian vulture in the back garden? This is the program to tell you . . . but slowly. The idea is for you to answer the program's questions, and the program will identify the bird.

It works well, but there are snags. It takes more than seven minutes to load the program to the point where questions start, at least five minutes for you to answer the questions, and, because the program is largely in BASIC, about two minutes to sort out the answer.
After all that time the bird has no doubt flown.

The screen display is, like the packaging, amateurish.

This really is a program in search of a purpose. A good book is cheaper, faster and has pictures; As a result of the way the program is written, it cannot be used as a bird data base either. Overall, disappointing in view of the amount of hard work that obviously went in to it.

D.M.

instructions	60%
playability	70%
graphics	10%
value for money	20%

★

IQ Test £5.75

Flowchart, 62 High Street, Irthlingborough, Northants, NN9 5TN

The IQ Test cassette has two tests, one on each side. Each has 25 questions to be answered in 20 minutes, time to go and time elapsed being shown on the screen.

The questions are typical multi-choice intelligence test items, some easy, some obscure — and at least one was wrong.

After the quiz the score is given, with a corresponding IQ rating, and the questions can be shown again with the correct answers.

The recording is low-level and high output is required to load successfully. However, the instructions are clear, and the program straightforward and easy to use.

Test 2, however, insisted on starting again when completed, and some juggling was necessary to get the score and answers without being told "You haven't answered any questions yet, you dummy".

If you like this kind of quiz you wil enjoy this cassette. But each test can really only be used once per person, and you may think that the price of £5.75 is a shade high for 40 minutes of intelligence test.

H.C.

instructions	80%
playability	70%
graphics	40%
value for money	40%

★ ★

Chemistry £10

Alchemy Software, 78 Tweendykes Road, Sutton, Hull, HU7 4XG

The program loaded first time, auto-ran, and used colour, sound and graphics effectively. Each program was user friendly (often with a touch of humour) and was well error trapped.

I did discover one bug — in the Compound program, when the computer gives the correct answer, it prints with the Over command on. As it prints across previous text, the correct answer seemed to be in Chinese!

I corrected this by adding line 3000 over 0, and after this the program worked correctly — check on this please, Alchemy!

Designed to cover the more complex chemistry topics up to and including 0 level, the programs ara:

Formula. which will tell you the formula of a compound you enter.

Atom to calculate the number of moles from the given mass of an element or vice-versa.

Moleculeto calculate the number of moles from a given mass of compound.

Compound works out formulae from moles.

Mass works out masses in an equation.

Volume works out masses and/or volumes in equations.

A first-class presentation of these topics, useful for use both at home or at school, with a well-written accompanying text. A ZX81 version is available.

R.E.

instructions	90%
playability	88%
graphics	72%
value for money	100%

★ ★ ★ ★

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Use the power of strings to handle words

The ZX81 and the Spectrum share a powerful system of handling strings. Ray Elder shows how it works with two example games to type in

Both the ZX81 and the Spectrum use a string handling system which is different from most other microcomputers. It is not inferior and, in certain applications, has a distinct advantage.

A string is generally accepted as being a sequence of letters, characters or numbers, and is identified by quotation marks at each end.

It can be used directly as in:
10 PRINT "HELLO"

or assigned to a string variable as in:
10 LET A$ = "HELLO"

By the use of the associated functions VAL, LEN, STR$, CODE, slicing and concatentation (look it up in the manual!), we have a very powerful device.

A brief outline of these functions:

VAL will give the numerical value of the string if it consists of numbers
LEN will tell you how many characters a string contains
STR$ converts a numerical variable or number to a string variable
CODE gives the value of the character's code (see manual appendix)
SLICING selects a character or group of characters from an existing string
CONCATENTATION adds strings together

At first sight these seem of little use, but do not underestimate them.

Selecting a character or group of characters from a string is achieved by using one of the following (presuming A$ to be "HELLO"):

a A$ (5) selects one character or "element" of A$, in this case the fifth (0)
b A$(2 to 4) selects the second to fourth elements (inclusive) from A$ (ELL)
c A$ (3 to) selects from the third element to the end of the string (LLO)
d A$ (to 2) selects from the start of the string up to, and including, the second element (HE)

If you are converting a listing for another machine to ZX then the following comparisons apply:

a MID$(A$,5,1)
b MID$(A$,2,3)
c RIGHT $ (A$, n)
n is the number of elements required counting from the END of the string: therefore A$ (4 to) = RIGHT $ (A$, 2)
d LEFT $(A$,n)
n is the number of elements counting from the start of the string, direct conversion from ZX, i.e. A$(to 3) = LEFT $ (A$,3)

The only real problem is c and an all purpose formulae for varying length strings is
RIGHT $(A$,n) is converted to A$(LEN A$ - (n - 1) to)

The Spectrum has READ and DATA functions, but in many cases these are easily simulated on the ZX81 by using strings. These techniques can also be used on the Spectrum, and, in some cases, provide an increase in speed over the conventional use of DATA.

Numerical DATA may be simulated by the following method, using VAL to convert the string variable to a numerical value.

```
10 LET A$ = "327654918 etc
(replacing 10 DATA
3,2,7.....)
20 LET A = VAL A$ (X)
```

Where X is the required element of A$ — for example, if you want the fourth item of DATA (element of A$) — X would equal 4, and so, at line 20, A would equal 6.

A slight problem occurs with numbers of more than one digit, especially with a set of numbers of varying digits (e.g. 12, 100, 5). This can be overcome by making all numbers contain the same amount of characters — padding smaller numbers with 0s in front.

For example: 150, 19, 7

Making each up to three digits: 150, 019, 007 (the value of 7 and 007 is the same)

Our string becomes
10 LET A$ = "150019007"

And is READ by
20 LET A = VAL A$ (X to X + 2)

X must start at a value of 1 and increase by a factor of +3. In the above example:
X = 1 then A = 150
X = 4 then A = 19
X = 7 then A = 7

DATA words can also be simulated by this method; as with numbers, all words must be of the same length. This time pad out shorter words by adding extra spaces to the end of the word:
10 LET A$ = "WEEK sp sp TODAY MONDAYFRIDAY"

Select words by
20 LET W$ = A$ (X to X +5)

Do not forget, X must increase by the length of the longest word each time — in our example this is six letters, therefore X must be 1, 7, 13 or 19.

You can also slice strings directly without first assigning them to a variable. This saves time and memory. Lines 10 and 20 could be written.
10 LET W$ = "WEEK sp sp TODAY sp MONDAYFRIDAY "(X to X +5)

Unfortunately if you have WEEK or TODAY you also have unwanted spaces. One way of removing these is to include the code:

```
20 FOR I = 1 to LEN W$
30 IF W$(I) = "sp" THEN
GOTO 60
40 NEXT I
50 GOTO 70
60 LET W$ = W$ (TO I - 1)
70 REM rest of program
```

We will now create a subroutine to select a random word. I used three separate strings, one each for six, seven- and eight-letter words and each containing 10 words. You can modify any of this to suit your own requirements, and even reduce it to one multi-length word string plus the "spaces" stripping routine.

Select a six-, seven-, or eight-letter word:

```
2000 LET Y = INT (RND *3
     + 6)
```

Select word from string:

```
2010 LET X = INT(RND *10)
     *Y + 1
```

Go to correct string:

```
2020 GOTO 2030 + (20 *(Y-6)
```

Six-, seven- and eight-letter strings

```
2030 LET W$ = "MONDAYF
     RIDAYSUNDAYAUGU
     STWINTERSUMMERE
     ASTERSPRINGAUTUM
     NMOMENT" (X to X +
     Y - 1)
2040 RETURN
2050 LET W$ = "TUESDAY
     WEEKDAYWEEKEND
     HOLIDAYJANUARY
     OCTOBEREVENINGDA
     YTIMEMINUTESSECO
     NDS" (X to X+Y-1)
2060 RETURN
2070 LET W$ = "THURSDA
     YSATURDAYTOMOR
     ROWFEBRUARYNOVE
     MBERDECEMBERCAL
     ENDARMIDNIGHTDA
     YBREAKMORNINGS"
```

(X to X+Y-1)
2080 RETURN

Here are two programs — Jumble and Hangman — to further illustrate the various uses of strings. Both need the subroutine, 2000-2080, above as well as the listed code, and both are skeleton programs.

I leave you to add scores, players' names, routines and so on.

Listing for Jumble — don't forget to insert the sub-routine (2000-2080) after line 510

```
  1 REM ***********
  2 REM * JUMBLE *
  3 REM ***********
 10 GOSUB 2000
 20 GOSUB 2100
 25 PRINT AT 0,8;"* J U M B L E
*"
 30 LET A$="          "( TO LEN M
$)
 35 PRINT AT 3,0;"CAN YOU UNSCR
AMBLE.... "
 60 GOSUB 2200
 70 FOR I=1 TO LEN M$
 80 PRINT AT 10,14-Y+I*2;" ";AT
 10,14-Y+I*2;"_"
 90 LET G$=INKEY$
 95 IF G$="" THEN GOTO 80
100 FOR J=1 TO LEN M$
110 IF G$<>M$(J) THEN GOTO 150
120 LET M$(J)=" "
130 LET A$(I)=G$
135 GOSUB 2200
140 GOTO 170
150 NEXT J
160 GOTO 80
170 NEXT I
180 IF A$=W$ THEN GOTO 500
190 PRINT AT 13,0;"WRONG,PRESS
T TO TRY AGAIN";TAB 12;"S TO SEE
 THE WORD"
200 LET G$=INKEY$
210 IF G$="" OR (G$<>"S" AND G$
<>"T") THEN GOTO 200
220 IF G$="T" THEN CLS
230 IF G$="T" THEN GOTO 20
250 PRINT AT 13,0;"      THE WOR
D WAS.. ";W$;TAB 12;"
    "
255 IF INKEY$<>"" THEN GOTO 255
260 PRINT AT 16,0;"PRESS ANY KE
Y TO PLAY"
270 IF INKEY$="" THEN GOTO 270
280 CLS
290 GOTO 10
500 PRINT AT 13,0;"WELL DONE, T
HAT IS CORRECT."
510 GOTO 260

2097 REM ***********************
2098 REM * MIX UP WORD (M$)  *
2099 REM ***********************
2100 LET M$=W$
2105 FOR I=1 TO 10
2110 LET X=INT (RND*LEN W$+1)
2120 LET M$=M$(X)+M$( TO X-1)+M$
(X+1 TO )
2130 NEXT I
2140 RETURN
2197 REM ***********************
2198 REM * PRINT A$ AND M$  *
2199 REM ***********************
2200 FOR K=1 TO LEN M$
2210 PRINT AT 6,14-Y+K*2;M$(K);A
T 10,14-Y+K*2;A$(K)
2220 NEXT K
2230 RETURN
```

Listing for Hangman — this also needs the sub-routine (2000-2080) in the article

```
  1 REM *   HANGMAN    *
  7 REM ****************
  8 REM * INIT. VARS. *
  9 REM ****************
 10 LET D=-19
 20 LET A$="ABCDEFGHIJKLMNOPQRS
TUVWXYZ"
 30 LET H$="48114911501151115211
53115411551156115711571156125611
35614561556165617561856195620562
15622552254225322522522151205220
53205119521953195118521853185210
75016511652165316541652155114521
45314511353135112531253125312"
 70 GOSUB 2000
 80 CLS
 90 LET X$=W$
 97 REM ***********************
 98 REM * PRINT/GET INPUTS  *
 99 REM ***********************
100 PRINT AT 0,10;"H A N G M A
N";AT 2,3;A$
110 FOR I=1 TO LEN W$
120 PRINT AT 10,10-Y+I*2;"-"
130 NEXT I
140 PRINT AT 14,3;"ENTER YOUR L
ETTER"
150 LET G$=INKEY$
160 IF G$="" OR CODE G$<38 THEN
 GOTO 150
170 IF CODE A$(CODE G$-37)>63 T
HEN GOTO 150
175 PRINT AT 14,3;"
    "
177 REM ****************
178 REM * CHECK INPUT *
179 REM ****************
180 LET F=0
190 FOR I=1 TO LEN W$
200 IF G$<>X$(I) THEN GOTO 230
210 PRINT AT 10,10-Y+I*2;G$
220 GOSUB 500
230 NEXT I
240 IF F=1 THEN GOTO 140
247 REM ******************
248 REM * WRONG ROUTINE *
249 REM ******************
250 LET D=D+20
260 PRINT AT 14,3;"SORRY,WRONG
GUESS"
265 GOSUB 520
270 FOR I=0 TO 20 STEP 4
280 PLOT VAL H$(D+I TO D+I+1),V
AL H$(D+I+2 TO D+I+3)
290 NEXT I
300 IF D<180 THEN GOTO 140
307 REM **************
308 REM * EXECUTION *
309 REM **************
310 UNPLOT 50,11
320 UNPLOT 51,11
330 UNPLOT 52,11
340 UNPLOT 53,11
350 UNPLOT 54,11
360 PRINT ,W$;TAB 24;"URGHH"
370 PRINT AT 19,3;"PRESS NEWLIN
E TO TRY AGAIN"
380 IF CODE INKEY$<>118 THEN GO
TO 380
390 RUN
497 REM ***************************
498 REM * X$/A$ UPDATE,PAUSE *
499 REM ***************************
500 LET X$(I)="  "
510 IF X$="          "( TO Y) THE
N GOTO 600
520 LET A$(CODE G$-37)=CHR$ (CO
DE G$+128)
530 PRINT AT 2,3;A$
540 LET F=1
550 FOR J=1 TO 30
560 NEXT J
570 RETURN
597 REM ****************
598 REM * WIN ROUTINE *
599 REM ****************
600 PRINT AT 15,6;"CONGRATULATI
ONS"
610 PRINT AT 19,2;"PRESS NEWLIN
E TO PLAY AGAIN"
615 PRINT AT 17,12;"[redacted]";AT
 17,12;"YOU WON"
620 IF CODE INKEY$<>118 THEN GO
TO 615
630 RUN
```

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The BBC Music Processor BBC B £14.95

Quicksilva, 13 Palmerston Road, Southampton SO1 1LL

The BBC has a very sophisticated sound generating capability which tends to be overlooked, partly because programming music from Basic is a lengthy and complex procedure. This program takes out the tedium and lets you concentrate on creating music. Supplied with a well written, twelve page booklet, it took me about two hours to master the operating proceedures.

All four sound channels can be used, the three envelopes adjusted, and speed, volume and many other controls are supplied, including a "recording" facility (with "dubbing", "erase" and "edit" on each "track"). Music can be saved on tape as a separate file.

The sound quality of the BBC speaker is poor, but with a modified system the results can be impressive — as the three supplied "files" demonstrate.

This is a beautifully versatile program which, as an ex-musician (failed!), I found impressive and valuable. The screen displays the various parameters and settings clearly, the program is well error trapped, user friendly and provides good user prompts.

If there had been a facility to output to screen or, more importantly, to printer, a manuscript display of completed compositions, the program would have been perfect. (If Quicksilva can produce an additional program to work in conjunction with the 'file' program to do this — reserve me a copy!) **R.E.**

instructions	85%
ease of use	95%
display	70%
value for money	95%

★ ★ ★ ★ ★

Shifty 48K Spectrum £5.50

Work Force, 140 Wilsden Avenue, Luton, Beds

With the cassette came a letter 15 inches long by 4 inches wide printed out using the Sinclair printer. To quote from it: "nobody can describe the standard Sinclair hardware as especially suitable for word processing, however, with some lateral thinking applied to the problem the main deficiency, the printer, has been overcome". What they mean is that any text over 32 characters in width (normal screen) is printed out sideways — hence the 15-inch-long letter.

A further quote: "we don't suggest anyone purchases Shifty as a dedicated word processor, but if your handwriting is like mine hand you need to upgrade your presetation then Shifty will allow you to do this at an acceptable cost". My own handwriting justified me purchasing a decent second hand typewriter. I have just worked out that if I used Shifty and the Sinclair printer, my average letter would be about a metre long!

With the tape came four pages of instructions set up by using SHIFTY, but printed out on a normal (I use that word advisedly) printer. Even so, I found using the program a tedious task. My advice to the programmer would be to either join a company which specialises in word processors, or use his or her very obvious talents for fun programs for the home computer market.

B.B.

instructions	75%
ease of use	40%
display	n/a
value for money	20%

★ ★

Juggernaut/ Auto Load, Buccaneer, Mirage/ Pre-Loads VIC-20 £5.95

Novasoft, 46 Pheasant Drive, Downley, High Wycombe, Bucks

Three cassettes with utility routines for VICs with any memory configuration.

Juggernaut enables you to relocate blocks of memory and, if desired, save memory to tape. As such, the routine funcitons correctly.

My main criticism is of the slightly misleading instructions. The author suggests that, provided you have RAM in the relevant block, you can store code in the ROM expansion area.

In order to do this, it is suggested that you may like to relocate your extra ROMs into lower RAM (a task apparently easily done by Juggernaut). I agree that it is simple to relocate the bulk of machine code, but there is no way that Juggernaut can relocate code which either alters the interrupt vector or uses a "Charget" wedge.

Since most extra ROMs use such techniques to add commands to BASIC, relocation of ROMs will be fraught with problems. Auto Load will boot code into the expansion ROM area should you want to use it.

Buccaneer is a copier program. With it you can make backup copies of software. It handled normal programs well but couldn't copy most of the protected software I tried.

Mirage enables you to reconfigure the memory map of your VIC. This is useful if you regularly alter the memory size and can't remember the easy way to do it.

Of greater value are the Pre-Loaders. These short routines are saved in front of a program requiring a changed memory map. When run the pre-loader changes the memory configuration and boots up the main program.

Overall an average bunch of routines which would offer better value if they were all on the same cassette. **A.W.**

instructions	85%
ease of use	70%
display	n/a
value for money	60%

★ ★ ★

Gem Character Generator Dragon £8.65

Gem Software, Unit D, The Maltings, Station Road, Sawbridgeworth, Herts.

This package is intended to make it easy for you to define your own character shapes to be used in the hi-res screen modes, and consists of two modules.

The first enables you to define up to 128 different characters which can be saved as a data file. You also have the facility to read in and update this file at any time.

To definine your characters, you are presented with a 7 by 9 grid whose rows and columns are numbered. Each square in the grid can be filled in to define the character.

As you are filling in this grid the character is drawn full size on another section of the screen so that you can see how it is taking shape.

Once you have completed the definitions the data is saved on cassette, so you can build up a library of different character sets. For example, one set could include proper lower case characters, another could have scientific symbols, and so on.

The second module is a demonstration program, and also contains the routines that are used to read in the character data file and then to print any selected characters anywhere on the hi-res screen. The characters are held in a two dimensional array and are referenced by their ASCII value.

An added feature is the facility to display your text vertically (that is, lying on its side), as well as horizontally. The demo program actually shows a sine graph with the axes rotated using both these formats.

The character drawing is a bit slow but tips on overcoming this are given in the clearly printed instruction leaflet. **C.D.**

instructions	85%
ease of use	80%
graphics	80%
value for money	80%

★ ★ ★

VU-Calc Spectrum £8.95

Psion, 2 Huntsworth Mews, Gloucester Place, London NW1 6DD

At one time, it was thought that an attempt to run a spreadsheet program on a microcomputer must be doomed to failure. Yet VU-Calc has all the functions you need for practical use.

On a 48K machine, it provides a matrix of 60 columns and 60 rows, four columns and 18 rows being visible at one time. The visible part of the matrix can be moved rapidly to a new position, allowing the whole array to be examined. Each 'box' provides room for seven characters, but text can be over-run into the next box.

A box can contain text, a number, or the result of a calculation based on the numbers in other boxes, using a mathematical equation entered by the user. The usual four mathematical functions available on calculators may be used, with brackets if needed.

Operation is straighforward once the essential concepts have been absorbed, and the contents of the matrix can be saved on tape and later reloaded. The only problem encountered was that the 'EXAMPLE' program on the side B failed to perform in a useful way, merely loading three ones into separate boxes, but a full array was loaded and restored without difficulty.

There are so many possible ways of using this program that it may take some time to realise its full potential. One matrix already stored away safely gives practice times for Grand Prix drivers, another contains household budget details, and those were the product of the first hour of serious use! Only the imagination of the user imposes a limit to the possibilities. **D.T.**

instructions	90%
ease of use	80%
display	80%
value for money	100%

★ ★ ★ ★ ★

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Game design and dragonware: R. Lowry

Cosmic Defender – for the BBC model B

"I thought I could do it ... now I'm not so sure, 'Hang on to 'em at all costs' were the orders from star command, it could cost me more than I bargained for! Even with the best star fighter in the galaxy!! I've got to hang on ... keep going ... must fight ... but for how long?..."

Defend the federation Plasmaton fuel dumps from the mindless suicide pilots of the alien battlefleet. Use your cosmic starfighters weaponry and hyperspace to destroy the evil enemy ... but watch your fuel, bonus points and fuel cost blood!!! How long can YOU hold out in this fast action game by Anthony Rafferty.

THE MISSING LINK

Acnean Mutoids – for the BBC model B

"Where am I"?.. A reasonable question, but the shock answer is only the first in a series of catastrophes that might lie ahead ... A bolt of lightning stabs your eyes as the monitor awakes you from stasi-sleep, only to tell you the worst!

Your interstellar cruiser has been invaded by the evil race known as the acneans – even worse, you are alone!!

In a micro-instant you realise the task that faces you is one of spine-tingling terror – you must risk all to save earth from a horrific destiny. Can you avoid the blood dripping, plasma curdling mutoids and activate the ship's self destruct computer – do you have the courage? Can you save mother earth??, can you save yourself??? the answer is surely ... how??? Superlative graphics and sound make this game by Phil Woodrow, the ultimate challenge!

Bandit – for the Dragon 32

Ruthless ... that's the only way to describe it, try your luck against the meanest fruit machine in the universe. 1,000 credits and you break the bank. It's not easy, but then, you wouldn't expect it to be would you???

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Game design and dragonware: R. Lowry

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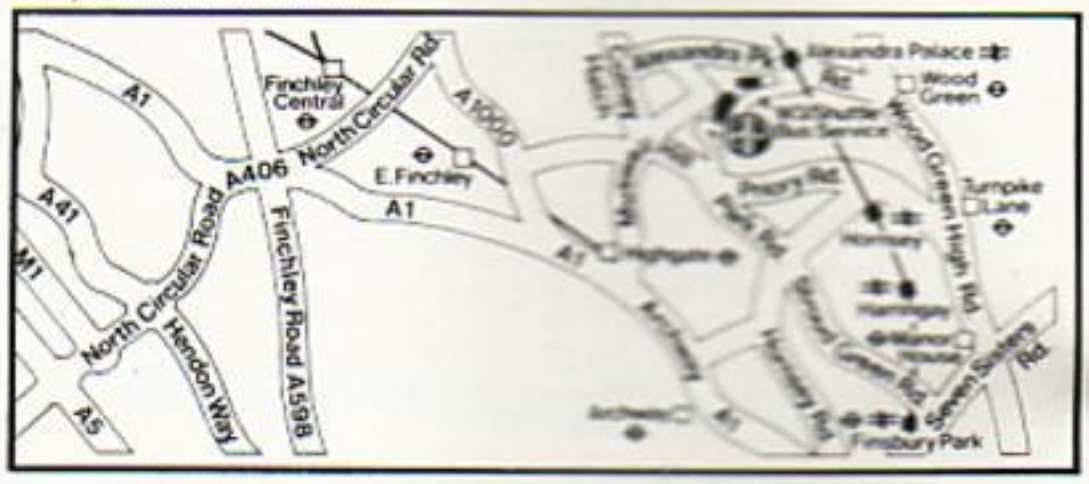

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Our team of reviewers assesses a selection of programs which mimic real-life games

Championship Darts
Dragon 32
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Shadow Software, 8 Hallgate, Thurnscoe, Nr. Rotherham

This clever implementation of the popular pub game makes it possible to get involved in the exciting atmosphere of a championship darts match without knocking chunks of plaster out of the kitchen wall!

The initial screen gives you the choice of starting play or viewing the instructions — which are almost unnecessary as playing the game is simple yet very effectively done. You start a match by entering the names of the two players and selecting who throws first.

The playing screens consist of a realistic dartboard drawn in hi-res, and an area that contains information on the players' current score, who is throwing, how many darts are left to throw, and a scoring table at the bottom of the screen.

Throwing a dart is carried out in two steps. Firstly, a spot moves very quickly around the dartboard and you select the number you wish to aim at by stopping that spot over that number by hitting any key.

Having done that, a small cursor moves rapidly across the scoring table which has doubles, trebles and so on marked on it, and once again you must stop the cursor to determine your score on that throw.

Sounds simple enough, but it proved to be an absorbing task trying to score that magic treble twenty! There are some simple sound effects in the game culminating in a splash of colour and sound when you hit 180!

C.D.

instructions	80%
playability	85%
graphics	80%
value for money	85%

★ ★ ★ ★

Do Not Pass Go
48K Spectrum
£5.50

Work Force, 140 Wilsden Avenue, Luton, Beds

In this computer version of the most famous board game in the world, the players no longer have to handle any money, or throw the die. These menial tasks are all done by the computer, leaving the kitchen table and the players' hands free for more important things, like drinking beer and eating sandwiches.

Leave room on the table for a small note pad, though, to keep track of what you have bought. Although the programme will give you a listing when asked for, it will not give you one when you most need it such as when buying houses etc.

Almost everyone must know how to play this game, so all you have to do is respond to the computer prompts. You should have no problems when loading, and there is a SAVE option which has certainly got the edge on the original game. Remember having to pack it up just when you were winning?

The layout of the board is on screen all the time you are playing. One small criticism of the graphics — some of the displays are difficult to read because of an ill-chosen combination of paper and ink. Other than that, it is as playable as the board version and still very a good family game for wet Sunday afternoons (at least, that's when we play it). **B.B.**

instructions	60%
playability	90%
graphics	70%
value for money	100%

★ ★ ★

Yahtzi
48K Spectrum
£5.50

Work Force, 140 Wilsden Avenue, Luton, Beds

From two to six players can take part in the game, which is based on the roll of five dice. The screen display is divided into two parts, the upper half showing the faces of the dice from one to six, and the lower half poker dice scores from four of a kind to a high run. Each player has three "throws", with a hold on each die if required.

At the end of the three throws you must take an option according to what is on the dice faces — so if you have four sixes you can take the sixes option or the four of a kind option, but the option can only be used once. A chance option gives you the value of the five faces of the dice added together. Five of a kind gives you a Yahtzi.

Two points that annoyed me. There is a printed line informing you that you should use keys 1 to 5 for holding, and I would have liked to have seen a longer delay for the print on screen. And at the point when you have completed your three throws, the game positively races on to the next player's go — a longer delay before moving on would be a great improvement.

B.B.

instructions	10%
playability	95%
graphics	85%
value for money	100%

★ ★ ★ ★

Golf
Dragon 32
£7.95

Salamander Software, Dept C, 27 Ditchling Rise, Brighton

This game offers you the choice of a straight matchplay competition between two players, or a one player game using the Stableford points system. All rules and general instructions are adequately explained in the four page leaflet, and I found it worthwhile reading it fully before starting a game.

The extra hazards you would expect in a real game of golf such as the wind and the rough have been simulated to make the game as realistic as possible. The colour graphics on the Dragon are used to define the fairways, of which there are nine different layouts, and the traps you must avoid such as bunkers and out-of-bounds are highlighted clearly enough.

A match can consist of nine or eighteen holes. On each stroke you are first given the chance to choose the direction you wish to hit the ball, and this is followed by a selection screen on which you choose your club for the stroke and how hard you want to hit the ball. Once you've reached the putting green you are given a full hi-res display showing the hole and the position of your ball.'

Doing my first round proved that I've never been on a golf course before, but this game was simple to play — even though I was given a handicap of twenty-two! You can also select your own handicap if you wish. Overall, a good simulation of the game that would interest both the pro and the raw beginner.

C.D.

instructions	90%
playability	85%
graphics	75%
value for money	80%

★ ★ ★

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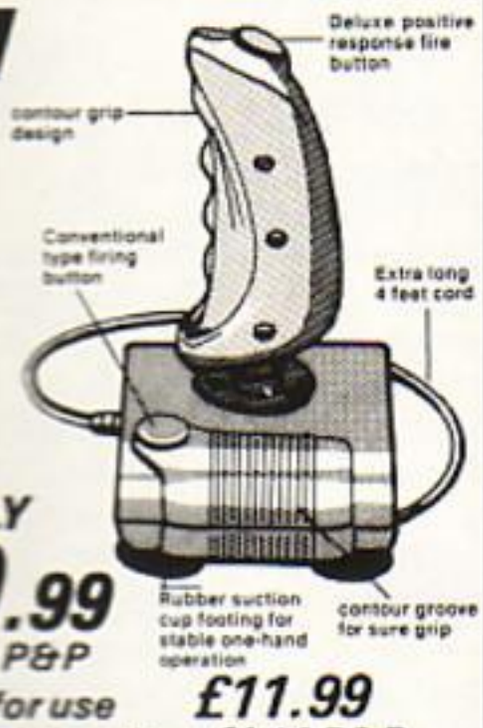

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HCW12

Mind games for your micro

These new releases all demand cunning, not brute force.Our review team give you their ratings after pitting their wits against them

Inkosi BBC B £5.95

Chalksoft, Lowmoor Cottage, Tonedale, Wellington, Somerset TA21 0AL

You are the head of that well-known tribe, The Inkosi, and your aim is to rule successfully for ten years.

As ruler you are nearly all-powerfull.

While being a successful leader means trying to maximise the amount of food and cattle available to the tribe, problems and calamities are not far off. War, harvest failures, the witchdoctor, hunters & raiders, rats, and different rates of population growth, all underline the point that a leader's life is not always an easy one!

If more than one third of the tribe starves or the population grows to more than 3000, then the witchdoctor quickly ends your leadership days. **P.C.**

instructions	80%
playability	50%
graphics	50%
value for money	30%

★ ★

Pioneer Trail 16K ZX81 £3.95

Quicksilva, 13 Palmerston Road, Southampton

Billed as a "Mind Game", Pioneer Trail is set in America in 1847. Your objective is to travel the 2,000 miles from Missouri to Oregon, but your funds are limited, and there aresundry hazards to hinder you.

Your control over the game is mainly in making constant decisions on whether to stop and stock up with more food, clothes, supplies and what have you. Too little and you starve/freeze/die of snakebite for lack of serum. Too much and you risk losing the lot in a buffalo stampede.

Apart from that, the game pretty much carries on without you.

For example, "You see travellers in the distance", announces the screen. "They look hostile. Do you want to fight/run/build a barricade/continue?" Don't fret too much about which to choose — it makes no difference.

Unless you choose to fight — in which case you get into shooting match.

What you have to do in these is press, as fast as you can, the key corresponding to the letter/number a creature moving across the screen. When it comes to telling the ZX81's S from 5, or Q from zero, it's mainly a test of how well you've adjusted the tv. I found I could do quite badly at this and still be told: "Good shooting. You scared them off".

Worse still are the little messages that flash up. "Rattlesnake!" it says. Then before you've had a chance to finish reading the message, let alone do anything else, it announces "You killed it". Who, me?

Never being good at balancing my budget at the best of times, I invariably starved to death after 900 miles or so, whichever of the 20 levels I played on.

C.G.

instructions	90%
playability	50%
graphics	20%
value for money	65%

★ ★

Miner Newbrain £8.50

Computasolve, 8 Central Parade, St Marks Hill, Surbiton, Surrey KT6 4PJ

Making an entertaining game without sound or colour in today's market is hard, so Newbrain users will be pleased to find both entertainment and educational qualities in this package.

The 19K of coding and interesting use of the low resolution graphics available in the Newbrain along with hardware editing facilities must add to the good value.

If you expect just "load" to work, it won't, so read the sparse but adequate instructions carefully. If it doesn't run without error, try adding a piece of code (FOR N=1 to 255: CLOSE/N:NEXT N).

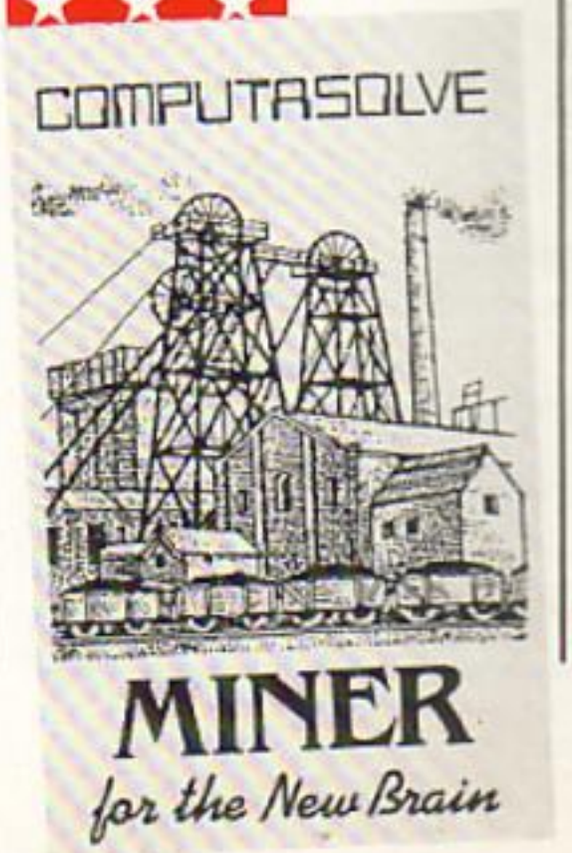
Miner itself is an enhanced form of Monopoly, in which you have to beat a target you set yourself in a time you set yourself and at a choice of three speeds.

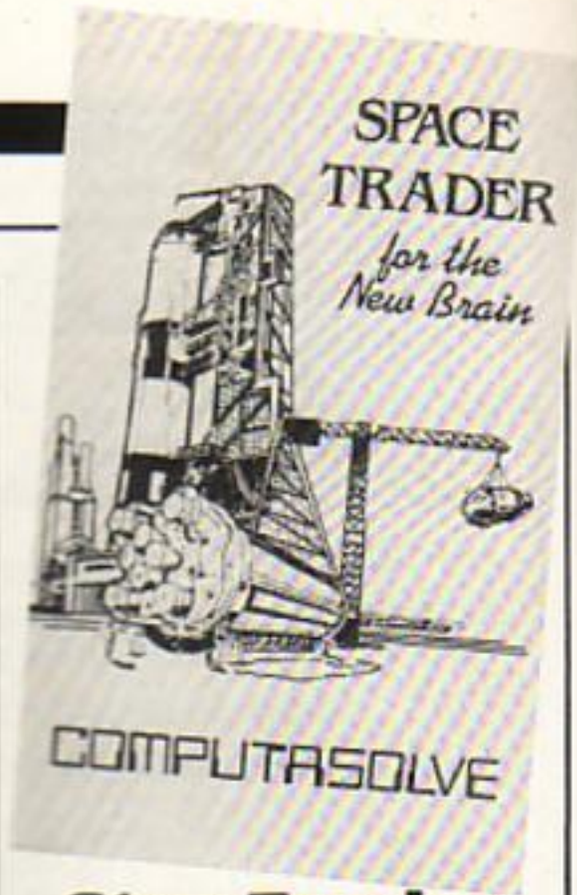
You are given mine workings at the start of the game and the opportunity to add to these, as well as transport facilities to get the units of production from the mine to a wharf and then warehouse.

The value of the units increases depending on their location, but in moving them by lorry, barge or ship you incur the random possibility of piracy, accident and disaster. As your funds increase by selling units, you can add more workings and transport to make your income mount up faster. **A.H.**

instructions	50%
playability	70%
graphics	30%
value for money	80%

★ ★ ★





Star Trader Newbrain £8.50

Computasolve, 8 Central Parade, St Marks Hill, Surbiton, Surrey

"Perpetual Insignificance" is the cost of failure in this text adventure game. Starting with a modest 17500 credits and five cargo shuttles , you have 40 days to make a profit so vast that your sponsors will consider you worthy of membership in the Federation of Space Traders.

Three well-presented text displays give full information on the current prices in the solar system, details of shuttle journeys and cargoes, and distances between the planets. Helpful prompts assist in buying and selling, and 'news flashes' tell you of events affecting prices, journey times, or cargoes.

After 40 'days' the computer evaluates your performance.

The program loaded easily from cassette and included a page of on-screen instructions and information before starting the game. No bugs were found, but there was one annoying spelling mistake (WNAT instead of WANT) and when playing at the fast speed some of the news flashes 'flashed' so briefly it was impossible to read them.

Generally an interesting and unpredictable, but slightly overpriced game of interplanetary commerce. **S.P.**

instructions	50%
playability	60%
graphics	40%
value for money	30%

★ ★ ★

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You'll believe you are on the golf course with a club in your hands. Mike Parks wrote his realistic golf game for the Video Genie and TRS-80 models I and III. All that's missing is the clubhouse . . .

Many computer golf games allow you you to play in ways that just aren't realistic.

For example, you would not use a driver to extract a ball from a bunker. Yet this is often allowed.

In my game, which runs in 16K on the Video Genie and TRS-80 models I and III, I have tried to be as realistic as possible.

These restrictions are built in:

- If the ball is in a bunker the proper club must be used or the shot will be fluffed.

- In trees you are given the choice of playing the shot — with a 50 per cent chance of success — or dropping out with a one-stroke penalty and having the ball moved clear.

- If the ball lands in water or out of bounds — off the screen — a penalty stroke is added and the ball re-played.

- Trying to use a wood out of the rough will result in a fluffed shot going only 20 yards.

To add more realism two players can take part and use either the stroke play or match play system.

A randomly generated wind force and direction for each hole makes the game reasonably difficult and adds variety for new games.

After inputting number of players and scoring system, each player is asked which is to give most problems.

Hook or **slice** means the ball is deflected left or right by up to 20 degrees respectively, except when putting.

Poor distance reduces each shot by 20 per cent.

Problems with bunker shots means a sand iron will be the only effective club from a bunker.

Putting problems means putts will vary in distance up to 20 per cent.

When the first hole is displayed you are asked for club and angle — club details are continuously displayed. If using an iron, percentage of swing is entered, NEWLINE giving 100 per cent. Angle for the shot is between 0 and 180 degrees positive (up) or negative (down), NEWLINE giving 0. Club selection can be aborted by inputting an asterisk as percentage or angle.

The game uses the normal

Variables

SO start address of video memory (constant)
BX,BY X, Y ball co-ordinates
FX,FY X, Y flag co-ordinates
H hole number
NP number of players
P player number
SS stroke play or match play indicator
WA two dimension array holding the "from" and "to" limits of any water hazard on the current hole
WS first dimension subscript into WA
TA,TS as above, but for tree hazards
DH distance hit
WE wind effect
WD wind direction
AN angle for shot
AO angle offline
CL club
NX,NY Horizontal and vertical vall movement, calculated from distance hit and angle
X,Y NX and NY converted to number of graphics blocks
XU,YU unsigned values of X, Y
OB out of bounds indicator
CA card array, holds strokes taken by each player and par for hole
The following are all two element arrays holding th eindicated data for each player:
PS players initials
PT problem type
BX,BY X, Y ball co-ordinates
BP absolute ball position (screen location)
OC old contents of screen location
ST strokes taken on current hole
The few remaining variables are used as temporary storage.

Conversion hints

My program uses a combination of pixel graphics and ordinary characters for each hole's payout. The Video Genie and TRS-80 have a resolution of 128 by 48, so compare this with your computer and see how tee, flag, trees and so on can be formed.

The data statements in line 25-50 will have to be changed. Establish a suitable scale and change the value by which ball movement is divided in lines 185-190.

Lines 190 and 195 check if the ball has moved off screen, so you will have to change the values to suit the maximum X and Y co-ordinates of your screen.

How it works

5-15	definition and DIMensions
20	moves ball one position
25-50	sub-routines to draw hazards
55-75	drawlayout of one hole
80-105	initialisation: requests number of players, players' initials, stroke or match play, difficulty
110-135	draw hole layout, print text, generate and display wind direction and force
140-150	request and input club and, with iron, percentage of swing
155	requests angle of shot (GOSUB 500), increments and displays strokes (GOSUB 495), checks if ball is in bunker and, if so, whether club is suitable
160	checks if ball is in trees and randomly determines result of shot
165-180	calculates distance hit and adds angle offline, calculates X, Y values for wind
185-195	calculate X and Y values for shot, check if off screen
200-215	move ball across screen
220-235	check if ball was out of bounds or in water, if so reset and increment strokes
240	checks if ball is in hole, if so updates score card and displays message
245-260	check if any ball is in hole, otherwise see which ball if furthest and set player code
265-280	check if ball is on green. If so, request putting strength and calculate distance
285-315	check, display status of ball. If in trees, option to drop out or play. On drop out move ball up or down until clear
320-345	executed at end of each hole, show status so far and determine who leads off next
350-385	executed at end of game, display scores
390-410	text strings (see 240)
415-445	sub-routine flashes ball at current location and question mark at location given by QP and wait for input
450-475	checks if ball is in hazard. Old contents (OC) value used to check for bunker or rough and boundary arrays for trees or water
480-490	calculate distance from hole
495	increment and display strokes
500	request and input angle
505	clears previous club details, displays which player's turn
510	delay sub-routine
515-565	data for layout of each hole
570-585	instructions

rules with the player furthest from the hole playing first and the winner of each hole teeing off first on the next hole.

At the end the score card shows par and strokes taken for each hole and, for match play, holes won, lost and halved.

There are nine holes, but more can easily be added or layout changed.

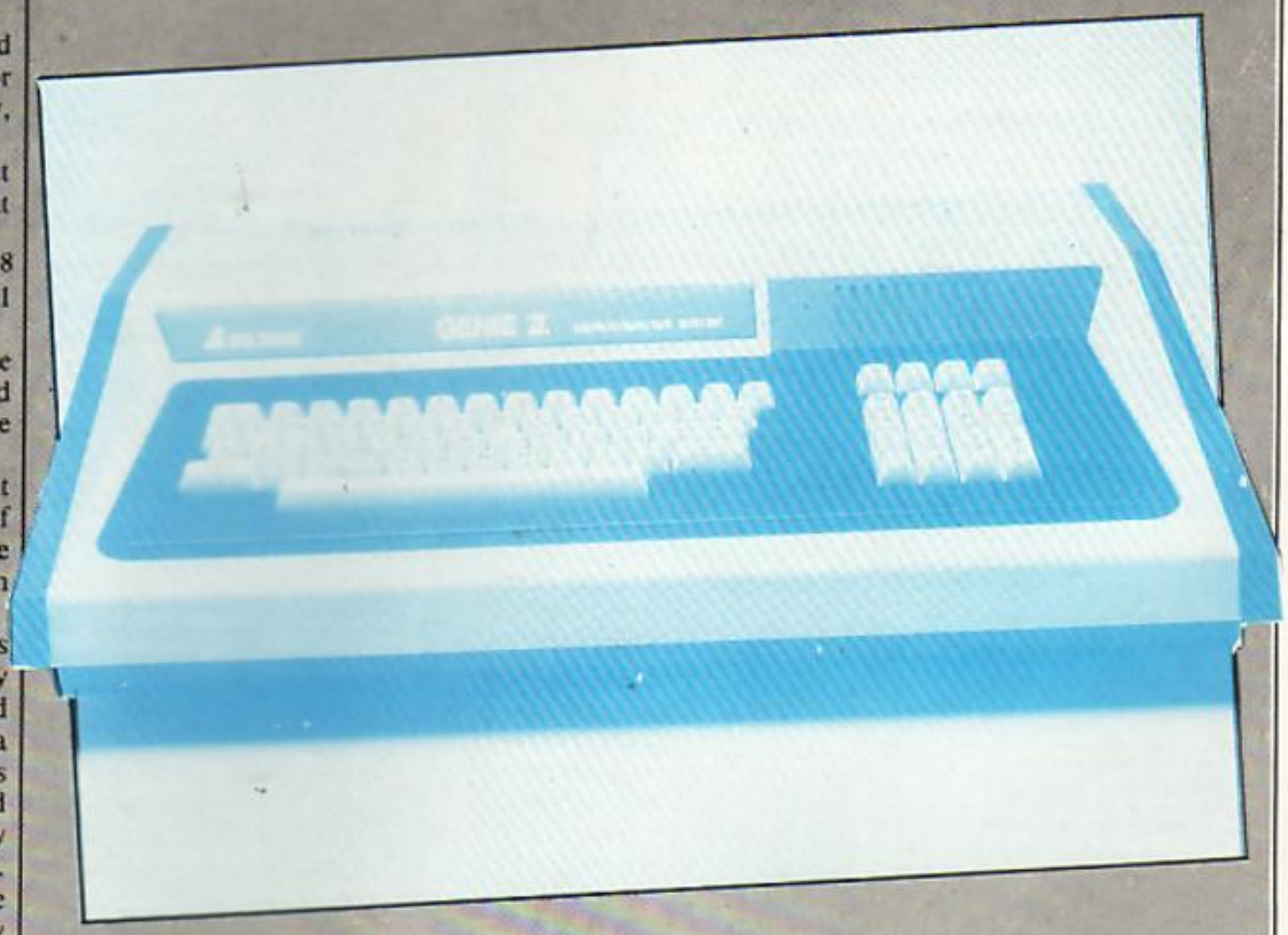
Hazard type codes: 768 water, 769 trees, 770 bunker, 771 rough.

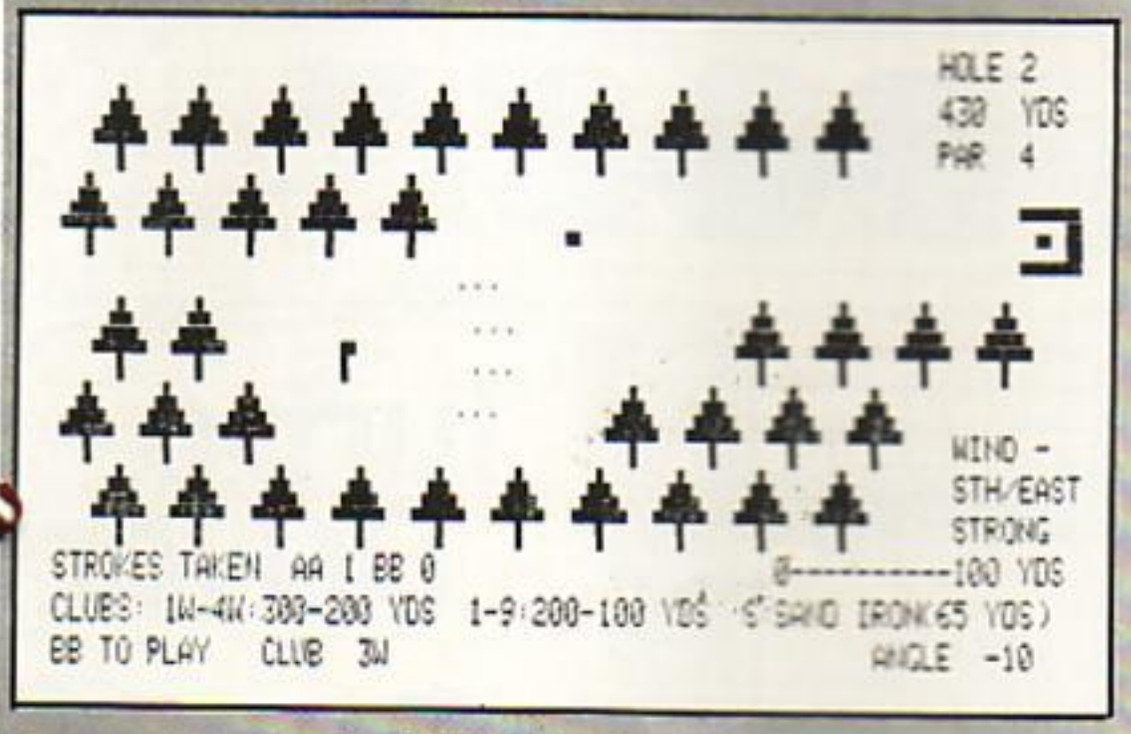
The tee position cannot have an X value greater than 122 and the Y value must correspond to the centre of a graphics block.

The flag position must be at least six cells down from the top of the screen or 18 cells up from the bottom and at least 12 cells in from the side.

The "from" and "to" points for water must be divisible by three, for trees divisible by five and for rough divisible by four. If a single tree or clump of rough is required then the "from" and "to" are made the same and they are always the same with a bunker.

You should be able to see how the data statements work by plotting them onto a worksheet.





Screen print-out, with full details of each hole and current score

```
5 REM      ********* GOLF ******** MIKE PARKS.FEB '83
10 CLEAR100:DEFINTA-Z:K0=0:K1=1:K2=2:K3=3:K4=4:K5=5:X=0:Y=0:XU=0:YU=0:F=0:N=0:P=
0:T=0:BX=0:BY=0:TX=0:TY=0:NX=0:NY=0:SX=0:SY=0:TS=0:US=0:SP=0:HX=0:SCN=15360:DR!=0.
017453293:BK$="...":W$=" WON BY":X$=" LEADS BY":Y$=" HOLES":Z$=" STROKES"
15 P1=960:P2=974:P3=696:P4=760:DIMTA(19,1),WA(13,1),CA(9,2),BX(1),BY(1),OC(1),ST
(1),PT(1),HT(1),TP(1):GOTO90
20 POKEBF,OC(P):TP(P)=INT(TY/K3)*64+TX/K2+SO:OC(P)=PEEK(TP(P)):SET(TX,TY):SET(TX
+K1,TY):BP=TP(P):IFSG=K0THENRETURNELSESG=K0:IFF=K0THENGET(BX(K1),BY(K1)):SET(BX(
K1),BY(K1)):NEXT:RETURNELSESET(BX(K0),BY(K0)):SET(BX(K0)+K1,BY(K0)):RETURN
25 WA(US,K0)=F:WA(US,K1)=T:US=US+K1:N=(T-F)/K5:F=F+SO:POKEF,136:FORI=K0TON-K1:Y=
3*X:POKEF+K1+Y,176:POKEF+K2+Y,134:POKEF+K3+Y,137:NEXT:RETURN
30 TA(TS,K0)=F-K1:TA(TS,K1)=T+K1:TA(TS+K1,K0)=F-65:TA(TS+K1,K1)=T-62:TS=TS+K2:IF
F=TTHEN34=K0ELSEN=(T-F)/K5
35 F=F+SO:FORI=K0TON:Y=K5*X:POKEF+Y,151:POKEF+Y+K1,131:POKEF+Y+K2,130:POKEF+Y+K1
,131:POKEF+Y-64,189:POKEF+Y-65,164:POKEF+Y-63,144:NEXT:RETURN
40 PRINT@F,BK$;:PRINT@F+65,BK$;:PRINT@F+129,BK$;:PRINT@F+192,BK$;:RETURN
45 IFF=TTHEN34=K0:ELSEN=(T-F)/K4
50 FORI=K0TON:PRINT@F+X*K4,CHR$(34);CHR$(34);:NEXT:RETURN
55 REM-DRAW HOLE
60 TS=K0:US=K0:READX,BY,FX,FY:SET(BX,BY):SET(BX+K1,BY):FORX=FXTOFX+K2:FORY=FYTOFY
+K2:SET(X,Y):NEXT:NEXT:READX,Y:NEXT:X=BX+K4:Y=BY+K1:FORI=K0TOK
2:SET(X,Y+N):SET(X+K1,Y+N):NEXT
65 SET(FX,FY):SET(FX,FY-K1):SET(FX,FY-K2):SET(FX+K1,FY-K2):BX(K0)=BX:BY(K0)=BY:I
FNP=K1THENBX(K1)=FX:BY(K1)=FYELSEBX(K1)=BX:BY(K1)=BY
70 READX:IFX=777THENREADF,T:PRINT@55,"HOLE"H;:PRINT@110,F;" YDS";:PRINT@103,"PAR
 "T;:CA(H,K2)=T:RETURNELSEIFX)767THENHT=X-767:READF,TELSEF=X:READT
75 ONHTGOSUB26,30,40,45:GOTO70
80 RANDOM:CLS:PRINT"WELCOME TO BYTE COUNTRY CLUB":PRINT"A CHALLENGING COURSE IN
RURAL RAMSHIRE":PRINT:PRINT"ONE OR TWO PLAYERS (TYPE 1 OR 2)"
85 INPUTNP:IFNP=1THEN95ELSEIFNP<>2THEN85ELSEFORP=K0TOK1:PRINT"PLAYER";P+K1;"INIT
IALS";:INPUTP$(P):NEXT:PRINT"STROKE PLAY(S) OR MATCH PLAY(M)
90 INPUTS$:IFS$<>"S"AND$<>"M"THEN90
95 FORP=K0TONP-1:PRINTP$(P);" WHICH ONE OF THE FOLLOWING GIVES YOU MOST PROBLEMS
```

```
100 INPUT"HOOK(0),SLICE(1),POOR DISTANCE(2),BUNKER SHOTS(3),PUTTING(4)";PT(P):IF
PT(P)>4THEN100ELSEHT(P)=K0:P=K0:H=K0:PRINT"DO YOU NEED INSTRUCTIONS"
105 INPUT"Y OR N";I$:IFI$="Y"THEN57ELSEIFI$<>"N"THEN105
110 H=H+K1:IFH=10THEN135ELSECLS:US=K0:TS=K0:GOSUB55:FORI=K0TOK1:ST(I)=K0:HT(I)=K
0:OC(I)=32:NEXT:PRINT@760,"STROKES TAKEN ";:PRINT@913,"0----------100 YDS";:PRIN
T@832,"CLUBS: 1W-4W:300-200 YDS 1-9:200-100 YDS S:SAND IRON(65 YDS)";
115 PRINT@832,"WIND -";:UD=RND(180):IFUD>K2+INT(UD/K2)THENUD=-UD
120 IFUD<-157THENPRINT@P3,"WEST";:UD=-180ELSEIFUD<-112THENPRINT@P3,"STH/WEST";:U
D=-135ELSEIFUD<-67THENPRINT@P3,"NORTH";:UD=-90ELSEIFUD<-22THENPRINT@P3,"NTH/EAST
";:UD=-45ELSEIFUD<22THENPRINT@P3,"EAST";:UD=0
125 IFUD>157THENPRINT@P3,"WEST";:UD=180ELSEIFUD>112THENPRINT@P3,"STH/WEST";:UD=1
35ELSEIFUD>67THENPRINT@P3,"SOUTH";:UD=90ELSEIFUD>22THENPRINT@P3,"STH/EAST";:UD=4
5
130 WF=RND(4):IFWF=K1THENPRINT@P4,"LIGHT";ELSEIFWF=K2THENPRINT@P4,"FRESH";ELSEIF
WF=K3THENPRINT@P4,"STRONG";ELSEPRINT@P4,"V/STRONG";
135 GOSUB505
140 PRINT@909,CHR$(240);:PRINT@909,"CLUB ";:QF=914:GOSUB415:PRINT@P1,CHR$(25
5);:A$=LEFT$(I$,K1):IFA$="0"ANDA$<="9"THEN145ELSEIFA$<>"S"THEN140ELSECL=15:GOTO1
50
145 IFLEN(I$)=K1THENCL=VAL(I$)+K4:GOTO150ELSEB$=MID$(I$,K2,K1):IFB$="U"THENIFA$<
"5"THENCL=VAL(A$):W=K1:GOTO155ELSE140ELSE140
150 PRINT@920,"PERCENT FULL SWING ";:QF=933:GOSUB415:IFI$="+"THEN140ELSEIFI$
="-"THENPRINT@948,"100";:W=K1:GOTO155ELSEW=VAL(I$):IFW<K10RW>100THEN150ELSEW=W/10
0
155 GOSUB500:IFI$="+"THEN140ELSEOB=K0:GOSUB495:IFHT(P)=K3ANDPT(P)=K3ANDCL<>15ORH
```

```
T(P)=K3ANDCL<9THENPRINT@P1,"SHOT FLUFFED - STILL IN BUNKER";:GOTO140ELSEIFHT(P)=
K4ANDCL<K5THENPRINT@P1,"SHOT FLUFFED - ONLY WENT 20 YARDS";:DM=20:GOSUB510:GOTO1
75
160 IFHT(P)=K3ANDRND(2)=K1THENPRINT@P1,"BAD LUCK - STILL IN TREES";:GOSUB510:GOT
O295
165 IFCL<K5THENDM=INT(313-(25*CL)+(25*RND(0))):ELSEDM=INT(256-(12.5*CL)+(12.5*RND
(0)))
170 DM=INT(DM*W):IFPT(P)=K2THENDM=INT(DM*.6)
175 IFPT(P)=K2THENRO=RND(20):IFPT(P)=K3THENRO=-ROELSEELSERO=RND(10):IFRO>K2=INT(
RO/K2)THENRO=-RO
180 RH=RH+RO:UE=INT((DM*WF)/15):TX=UE*COS(UD*DR!):TY=UE*SIN(UD*DR!)
185 NX=INT(DM*COS(RH*DR!)+TX):X=INT(NX/K5+(NX/K5-INT(NX/K5))):IFX<K2<>INT(X/K2)T
HENX=X+K1
190 NY=INT(DM*SIN(RH*DR!)+TY):Y=INT(NY/10+(NY/10-INT(NY/10))):IFBX=X<KOTHENBX=K0
:XU=BX/K2:OB=K1ELSEIFBX=X/126THENBX=126:XU=(NX-BX)/K2:OB=K1ELSEBX=BX-X:XU=ABS(X)
/K2
195 IFBY-Y<K0THENBY=K0:YU=BY:OB=K1ELSEIFBY-Y>35THENBY=35:YU=BY-BY:OB=K1ELSEBY=BY
-Y:YU=ABS(Y)
200 REM-MOVE BALL
205 TX=BX:TY=BY:IFXU=K0THENXU=YUELSEIFYU=K0THENYU=XUELSEIFXU=YUTHENXU=INT(XU/YU)EL
SEN=INT(YU/XU)
210 IFXU=YUTHENFORF=K1TOYU:FORT=K1TON:TX=TX-2*SGN(X):GOSUB620:NEXT:TY=TY-SGN(Y):
GOSUB620:NEXTELSEFORF=K1TOXU:FORT=K1TON:TY=TY-SGN(Y):GOSUB620:NEXT:TX=TX-2*SGN(X):
GOSUB620:NEXT
215 TX=NX:TY=NY:GOSUB620:GOSUB650:IFP=K0THENIFTP(K0)=TP(K1)THENOC(K0)=OC(K1):SB=K
1ELSEELSEIFTP(K1)=TP(K0)THENOC(K1)=OC(K0):SB=K1
220 REM-CHECK FOR OUT OF BOUNDS OR IN WATER
225 IFOB=K1THENPRINT@P1,"BALL WENT OUT OF BOUNDS - ";:GOTO235ELSEIFHT(P)<>K1THEN
BX=NX:BY=NY:BX(P)=NX:BY(P)=NY:GOTO240
230 PRINT@P1,"  BALL WENT INTO WATER - ";
235 PRINT@966,"PLAY FROM PREVIOUS POSITION";:BX=BX(P):BY=BY(P):TX=BX(P):TY=BY(P)
:GOSUB620:GOSUB495:GOSUB510:GOTO290
240 IFBX<>FXORBY<>FYTHEN250ELSECA(H,P)=ST(P):IFST(P)=K1THENPRINT@P1,"A HOLE IN O
NE - THE DRINKS ARE ON YOU !!!";ELSEPRINT@960,"DOWN IN ";ST(P);:X=ST(P)-CA(H,K2)
:ON X+K4GOSUB390,395,400,405,410:GOSUB510
245 REM-CHECK BALL POSITIONS
```

VIDEO GENIE/TRS-80 PROGRAM

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250 IFBX(K0)=FTHENBX(K0)=FYTHENF=K0ELSEBX=BX(K0):BY=BY(K0):N=K0:GOSUB480
255 IFBX(K1)=FTHENBX(K1)=FYTHENIFF=K0THEN325ELSET=K0ELSEBX=BX(K1):BY=BY(K1):N=K1
:GOSUB480
260 IFF>TTHENF=K0ELSEF=K1:F=T
265 BX=BX(P):BY=BY(P):IFF>6THEN290ELSEPRINT@652,CHR$(255);:GOSUB505
270 PRINT@909,"PUTTING STRENGTH 1-9       ";:GP=921:GOSUB415:CL=VAL(I$):IFCL<K1OR
CL>10THEN270ELSEGOSUB500:IFI$="*"THEN270ELSEGOSUB495
275 IFPT(P)=K4THENDH=CL*9+(CL*RND(4))ELSEDH=CL*10
280 T=K0:TY=K0:GOTO185
285 REM-CHECK & DISPLAY BALL STATUS
290 GOSUB505:IFST(P)=K0THEN140ELSETX=BX:TY=BY:GOSUB450:IFHT(P)<>K2THEN310
295 PRINT@91,"   BALL LANDED IN TREES - PLAY(P) OR (A)P(D)       ";:GP=1005:GOSUB4
15:IFI$="P"THEN140ELSEIFI$<>"D"THEN295ELSEGOSUB495:IFBY(16THENF=K1ELSEF=K1
300 REM-MOVE BALL CLEAR OF TREES
305 BY=BY+F:TY=BY:GOSUB20:GOSUB450:IFHT(P)=K2THEN305ELSE140
310 IFDB=K1ORHT(P)=K1THEN140ELSEPRINT@91,"BALL IS ";:IFHT(P)=K0THENPRINT@960,"ON
 FAIRWAY":ELSEIFHT(P)=K3THENPRINT@960,"IN BUNKER":ELSEPRINT@960,"IN ROUGH"
315 GOTO140
320 REM-CHECK & DISPLAY STATUS OF MATCH
325 IFNP=K1THEN115ELSEIFCA(H,K0)=CA(H,K1)THENP=FF:CA(H,K3)=K2ELSEIFCA(H,K0)<(CA(H
,K1)THENP=K0:PF=K0:CA(H,K3)=K0ELSEP=K1:PF=K1:CA(H,K3)=K1
330 X=K0:Y=K0:IFS$="M"THENFQ=FN*1TOH:IFCA(F,K3)=K0THENX=X+1:NEXTELSEIFCA(F,K3)=
K1THENY=Y+K1:NEXTELSENEXTELSEFORF=K1TOH:X=X+CA(F,K0):Y=Y+CA(F,K1):NEXT
335 IFX=YTHENPRINT@91,"THE MATCH IS EVEN":GOTO345ELSEIFX>YTHENPRINT@91,P$(K0);X
;:X=Y:ELSEPRINT@91,P$(K1);:X=Y-X
340 IFS$="M"THENPRINT@976,Y$:ELSEPRINT@976,29;
345 GOSUB510:GOTO110
350 CLS:X=K0:Y=K0:F=K0:N=K0:NY=K0:PRINTTAB(24)"SCORE CARD":PRINTTAG(13)"HOLE P
AR   ";:IFNP=K1THENPRINT"SCORE"ELSEPRINTP$(K0);"     ";P$(K1);:IFS$="M"THENPRINTUSE
LSEPRINT
355 FORH=K1TO9:PRINTTAB(20)H;:PRINTTAB(25)CA(H,K2);:F=F+CA(H,K2):PRINTTAG(30)USI
NG"##";CA(H,K0);:X=X+CA(H,K0):IFNP=K1THENPRINT:GOTO365ELSEPRINTTAB(35)USING"##";
CA(H,K1);:Y=Y+CA(H,K1)
360 IFS$="S"THENPRINT:GOTO365ELSEIFCA(H,K3)=K2THENPRINTTAB(39)"HALVED"ELSEPRINTT
AB(41)P$(CA(H,K3));:IFCA(H,K3)=K0THEN80ELSEN=N+1ELSEN=NY+K1
365 NEXT
370 PRINTTAB(24)F;:PRINTTAB(29)X;:IFNP=K1THENPRINT:GOTO385ELSEPRINTTAB(34)Y:PRIN
T:IFS$="N"THENIFN=NTHEN385ELSEIFN>NYTHENPRINTTAG(20)P$(K0);U$;N-NY;Y$:GOTO36
5ELSEPRINTTAB(20)P$(K1);U$;NY-N;Y$:GOTO365
375 IFX=YTHEN380ELSEIFX<YTHENPRINTTAB(20)P$(K0);U$;Y-X;Z$:GOTO385ELSEPRINTTAB(20
)P$(K1);U$;X-Y;Z$:GOTO385
380 PRINTTAB(20)"THE MATCH WAS HALVED"
385 PRINT:INPUT"HIT NEWLINE FOR A NEW GAME",A$:RESTORE:GOTO90
390 PRINT@P2,"AN ALBATROSS";:RETURN
395 PRINT@P2,"AN EAGLE";:RETURN
400 PRINT@P2,"A BIRDIE";:RETURN
405 PRINT@P2,"A PAR";:RETURN
410 PRINT@P2,"A BOGEY";:RETURN
415 REM-SUBR TO FLASH BALL @ LOCN "BX,BY",A 1 @ LOCN OR AND WAIT FOR I-P
420 BP=INT(BY/K3)*64+BX-K2+SO:I$=INKEY$:I$=""
425 F=K1:T=32:GOSUB440:IFX<>10THEN430ELSEF=K0:T=63:GOSUB440:IFX=10THEN425
430 POKEOP+SO,32:IFASC(A$)=13THENRETURNELSEIFASC(A$)=8THENIFLEN(I$)>K0THENI$=LEF
T$(I$,LEN(I$)-1):PRINT@OP+K1," ";ELSEELSEI$=I$+A$
435 PRINT@OP+K1,I$;:GOTO425
440 POKEOP+SO,T:X=K0:IFF=K1THENSET(BX,BY):SET(BX+K1,BY):ELSERESET(BX,BY):RESET(BX
+K1,BY)
445 A$=INKEY$:IFA$<>""THENRETURNELSEX=X+K1:IFX=10THENRETURNELSE445
450 REM-SEE IF BALL POSITION IS IN A HAZARD
```

```
455 HT(P)=K0:IFOC(P)=6THENHT(P)=3:RETURNELSEIFOC(P)=34THENHT(P)=4:RETURNELSET
P=INT(TY/K3)*64+TX-K2
460 IFTS=K0THEN470ELSEFORX=K0TOTS-K1:IFTP=TA(X,K0)ANDTP=TA(X,K1)THENHT(P)=K2:N
EXTELSENEXT
465 IFHT(P)=K2THENRETURN
470 IFUS=K0THENRETURNELSEFORX=K0TONG-K1:IFTP=UR(X,K0)ANDTP=UR(X,K1)THENHT(P)=K
1:NEXTELSENEXT
475 RETURN
480 IFB=F:THENB=-F:B=B+SELSEB=B-F
485 IFB<F:THENB=F-B:B=B+SELSEB=B-F
490 T=INT(SQR(K2*B))-1:IFB=K1THENRETURNELSEF=T:RETURN
495 ST(P)=ST(P)+K1:PRINT@703,P$(K0);ST(K0);:IFB=K1THENRETURNELSEPRINTP$(K1);ST(
K1);:RETURN
500 PRINT@947,"ANGLE      ";:GP=957:GOSUB415:IFI$="*"THENRETURNELSEIFI$="-"ORI$=
"0"THENB=K0:PRINT@954,"0";:RETURNELSEB=LEFT$(I$,K1):D=VAL(B$):IFD<K0ORD>90THEN500ELSEIFA$=
"-"THENB=-B:RETURNELSEIFA$<>"+"THEN500ELSERETURN
505 PRINT@936,CHR$(255);:IFP=K2THENPRINT@976,P$(P);" TO PLAY";:RETURNELSERETURN

510 FORI=K0TO1000:NEXT:PRINT@P1,CHR$(255);:RETURN
515 DATA22,16,10,11,769,64,114,219,279,768,841,960,632,617,663,604,727,740,771,
0,16,66,76,123,132,194,196,256,258,322,322,384,386,450,510,512,530,552,572,579,6
90,622,624,640,660,680,692,706,722,738,754,777,820,5
520 DATA 122,15,36,25,769,31,37,90,104,162,168,217,219,234,290,351,357,410,424,4
3,770,345,349,777,430,4
525 DATA 122,16,32,25,768,31,37,90,104,162,168,217,219,234,290,351,357,410,424,4
79,485,546,552,613,619,680,686,741,747,771,5,37,42,90,95,97,100,116,131,165,170,
170,193,217,232,282,289,479,521,529,587,639,641,677,679,690,694,705,737,752,756,
777,825,4
530 DATA 574,577,598,601,609,624,630,643,677,679,690,694,705,737,752,756,777,825,
535 DATA 122,17,22,26,771,32,40,94,114,140,175,210,214,242,254,260,272,300,316,3
32,354,384,390,450,450,512,512,564,572,578,630,636,640,644,664,692,706,752,7
540 DATA 122,21,42,14,769,65,115,220,240,256,321,407,427,737,757,771,5,15,65,81,
63,66,91,196,206,322,327,770,160,160,480,480,777,5
545 DATA 122,19,20,11,760,3,15,64,69,79,96,112,119,149,159,170,179,213,225,231,2
31,143,195,205,260,267,321,335,387,399,449,465,515,535,577,602,643,659,705,721,
770,295,295,777,406,4
550 DATA 122,22,12,9,769,144,179,208,318,417,440,771,0,0,9,9,256,256,322,326,384
,392,450,450,512,520,570,630,640,692,706,770,770,206,206,777,578,5
555 DATA 120,10,69,23,771,2,50,64,114,130,170,192,252,256,314,320,376,384,406,43
0,438,440,464,492,504,514,570,884,874,876,896,618,620,642,694,704,706,770,353,35
4,769,29,35,80,96,149,155,216,223,283,289,347,353,400,414,469,475,533,539,600,60
6,650,667,717,725
560 DATA 777,261,3
565 DATA 122,13,12,29,771,0,24,32,32,48,52,66,96,94,94,106,114,128,152,160,160,1
40,150,154,214,220,222,256,264,322,322,384,386,411,413,420,444,462,510,520,572,5
94,630,650,692,704,704,714,750,770,26,26,34,34,344,344,352,352,469,469,777,800,5

570 CLS:PRINT"THE FOLLOWING QUESTIONS ARE ASKED FOR EACH SHOT-

CLUB - THIS IS SELECTED ACCORDING TO THE DISTANCE REQUIRED.
  THE DISTANCES FOR VARIOUS CLUBS IS CONTINUOUSLY DISPLAYED"
575 PRINT"PERCENT FULL SWING - ONLY APPLIES TO IRONS.MAY BE USED
  WHEN THE FULL DISTANCE FOR THE CLUB IS TOO FAR.
  (NEWLINE GIVES 100 PERCENT).
ANGLE - THIS SPECIFIES THE ANGLE IN DEGREES ABOVE(+)
  OR BELOW(-) THE HORIZONTAL. THE RANGE IS +,- 0 TO 130.
580 PRINT"  ANGLES > 90 WILL MOVE THE BALL FROM LEFT TO RIGHT.
  (NEWLINE GIVES 0 DEGREES)."
585 PRINT"PUTTING STRENGTH IS SELECTED BETWEEN 1 AND 9.
1 UNIT WILL MOVE THE BALL 1 BALL WIDTH.
WIND DIRECTION IS GIVEN AS COMING FROM WEST,ENE,WEST ETC.":INPUT"HIT NEWLINE WHE
N READY TO PLAY";I$:GOTO110
```


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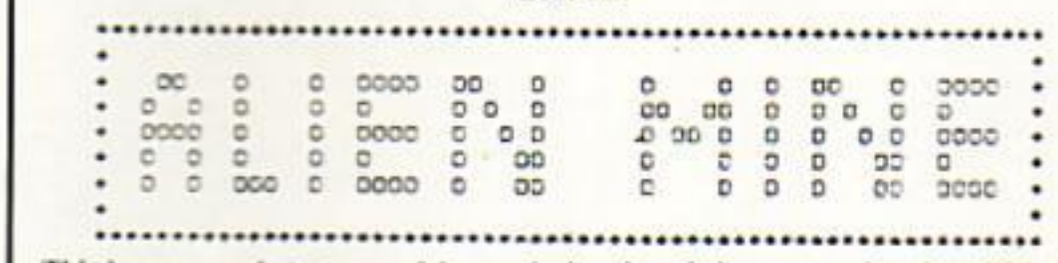

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